THE METAL INDUSTRY
WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD, COPPER AND BRASS, THE BRASS FOUNDER AND FINISHER AND
ELECTRO-PLATERS REVIEW

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THE CHICAGO CONVENTION

A BRIEF REPORT OF THE FOUNDRYMEN'S ASSOCIATIONS ASSEMBLED IN CONVENTION AT CHICAGO, ILL., SEPTEMBER 7 TO 11, 1914, AND THE EXHIBITION OF THE FOUNDRY AND MACHINE EXHIBITION COMPANY, HELD AT THE SAME TIME.

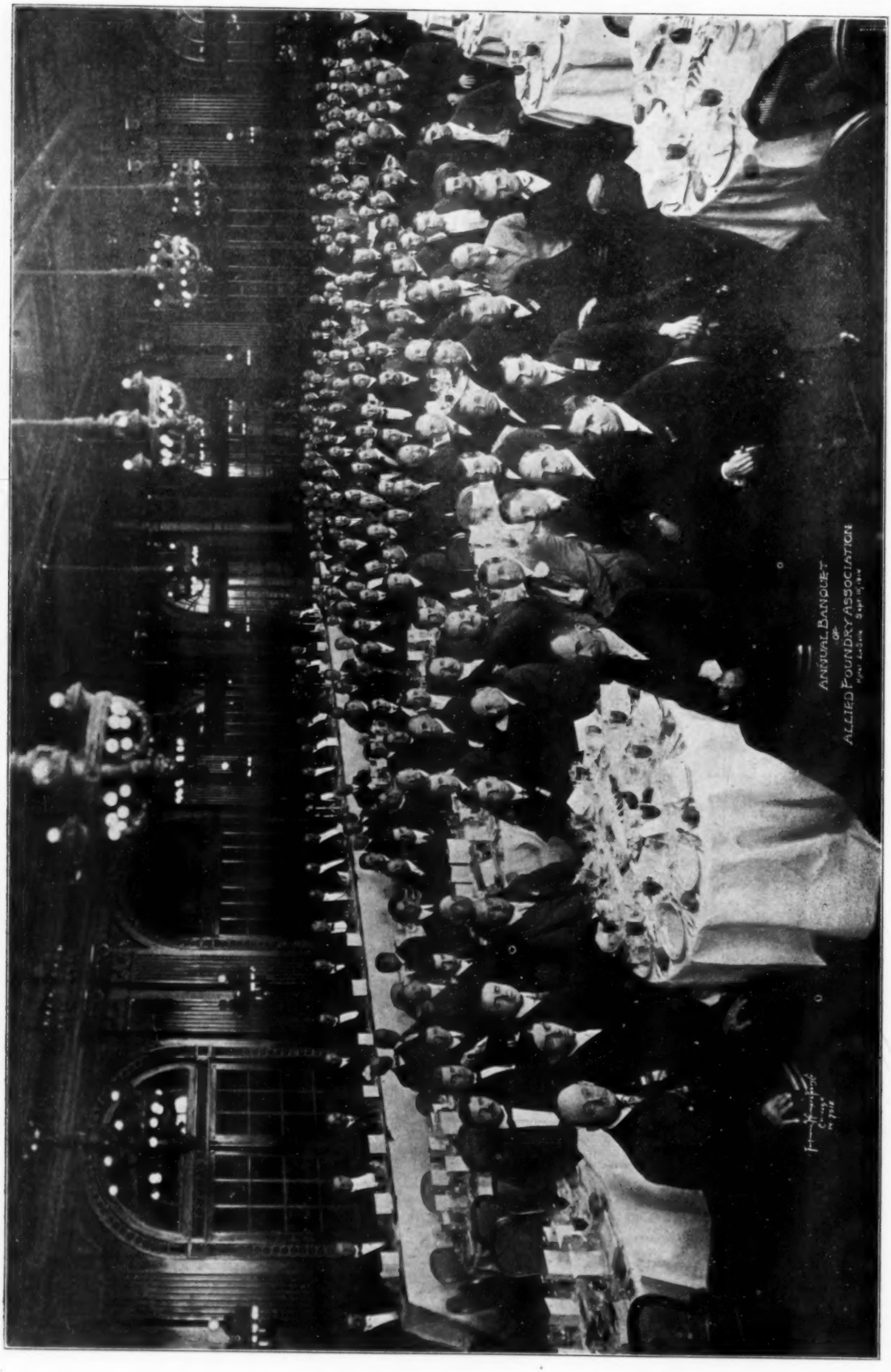
The foundrymen's convention for 1914 was held in Chicago, Ill., and considering that the 1913 convention had been held in the same city, the meeting was a remarkable success, particularly from an educational standpoint. The associations participating in this joint convention were as follows: The American Foundrymen's Association, The American Institute of Metals and the Associated Foundry Foremen. These associations opened the convention at the Hotel La Salle on Tuesday morning, September 8, with a joint session. At this session President Alfred H. Howell, of the American Foundrymen's Association, presided. After calling the meeting to order Mr. Howell introduced H. O. Lange, chairman of the General Committee in charge of the convention, who made an address of welcome to the delegates of the three associations. Following Mr. Lange came Presidents Howell, of the American Foundrymen; G. H. Clamer, of the Institute of Metals, and S. V. Blair, of the Associated Foundry Foremen, who in brief but spirited addresses told of the progress and aims of their respective societies and expressed their appreciation of the hearty welcome tendered them by the City of Chicago.

EMBLEMS OF REPRESENTATION.

President Howell then announced that during the year he had appointed a new secretary to succeed Dr. Richard Moldenke, who had resigned. Mr. A. O. Backert was then introduced and responded with a few words and read a telegram of good wishes from Dr. Moldenke which was enthusiastically received and Mr. Backert was directed by a unanimous vote to reply to Dr. Moldenke, expressing appreciation of his thoughtfulness. Following these interesting addresses the session quickly got down to business and the first paper of the day was presented. M. W. Alexander, of the General Electric Company, Lynn, Mass., delivered an illustrated address on SAFETY IN FOUNDRY OPERATIONS. Mr. Alexander's forceful and entertaining manner in presenting his subject was thoroughly enjoyed aside from the fact that every one present was deeply concerned in the subject of safety to workmen. Mr. Alexander in the course of his lecture gave some very valuable facts and figures as to the results of the work being done by the General Electric Company in the interests of their employees. Mr. Alexander was followed by Fred. Moerl, of the Pullman Company, Chicago, Ill., who read a very interesting paper on the same subject, SAFETY AND SANITATION AS APPLIED TO THE SHOPS OF THE PULLMAN CAR COMPANY. His paper was appropriately illustrated with lantern slides which were clearly explained by Mr. Moerl. Other papers read at this meeting were as follows: NOTES ON SAFETY ORGANIZATION, A. W. Gregg and G. F. Kent, Milwaukee, Wis.; PROGRESS IN THE SAFETY FIRST MOVEMENT, Arthur T. Morey, Granite City, Ill.; SAFETY FIRST, F. W. Reidenbach, Rochester, N. Y.; SAFETY IN CONNECTION WITH GRINDING WHEEL OPERATIONS, R. G. Williams, Worcester, Mass.; SAFETY FIRST—DRIVING BACK THE SALOON, Thomas D. West, Cleveland, Ohio.

SESSIONS OF THE INSTITUTE OF METALS.

The Tuesday afternoon session of the Institute of Metals was held in the east room of the Hotel La Salle,



BANQUET OF ALLIED FOUNDRYMEN'S ASSOCIATIONS, HELD AT HOTEL LA SALLE, CHICAGO, ILL., SEPTEMBER 10, 1914.

as were all of the succeeding sessions of this association. This change from the published program of the meetings from the Stock Yards Inn to the Hotel was made on account of the distance from the inn to the hotel and also because of the noisy conditions at the inn.

The session opened with President Clamer in the chair and the report of the official chemist of the institute, Arthur T. Little, written by Carl F. Woods, secretary, was read. Mr. Woods reviewed the metallurgical happenings of the past year and made mention of the more important papers presented at various society meetings and closed his report with the following remarks:

The most significant occurrence of the past year from many points of view, has been the co-operation of this institute with the American Chemical Society, the Mining Engineers, the American Society for Testing Materials, and the Bureau of Standards.

This joint committee embodies the long and increasingly felt want for a systematic and thorough standardization of the many factors in the industry. It has become evident that thorough specifications for finished product frequently necessitated a knowledge extending back of the brass founder to the mine; that the metallurgists themselves could profit by knowledge of foundry needs and limitations. Such advance and interchange of ideas is achieved most readily through a medium such as this committee offers. The amount of research work essential to the proper development of the non-ferrous industry is very great in view of the comparatively few combinations of metals in commercial use as compared with the possible alloys which are as yet unknown. The Institute of Metals, representing as it does the most important phase of the industry, should continue as the leader in this work, and, with strength increasing with its years, should make for itself a very vital place in the economic life.

REPORT OF SECRETARY-TREASURER.

Secretary W. H. Corse then presented his report for the year which was as follows:

Our membership July 1, 1913, was 277; our membership July 1, 1914, was 276. Our membership at the present time is 287 after allowing for 17 members dropped for non-payment of dues. You will see therefore that we have more than held our own this last year, credit for which is due to the work by the executive committee, especially to our president who financed and carried on an active membership campaign.

I am glad to say that the co-operative work with the Bureau of Mines has developed in splendid shape. Each one of our members has received the bulletin on Brass Furnace Practice, by Dr. H. W. Gillett. This shows an enormous amount of work done, and gives a collection of facts which has not been published before. Dr. Gillett is to be congratulated on the appearance of this bulletin, and the institute is to be congratulated also on securing his co-operation on the staff of the Bureau of Mines.

The Bureau of Standards has been doing some excellent work on test bars. The advisory committee mentioned last year, consisting of representatives from several technical societies, is now an assured fact, and is holding regular meetings at the Bureau in Washington to discuss in a practical way the problems taken up by the bureau officials.

Dr. Burgess and Mr. Karr have both shown great interest in our work, and I wish to thank them in the name of the institute for the interest they have taken.

Our transactions are steadily growing in size, as will be seen by the following figures: Volume 6 contained 338 pages; volume 7 contained 445 pages. Volume 6 contained 15 papers; volume 7 contained 23 papers, and volume 8 will undoubtedly contain more than 30 papers.

The finances of the institute have been somewhat strained to pay for this enormous increase in printed matter, but the executive committee, believing that our members should get the maximum amount of printed matter, have asked a number of our most prominent members to hold sustaining memberships, a plan which was successfully carried out by the Society for Testing Materials for a number of years. I am glad to say that our membership has responded generously to this appeal, and our deficit of last year for printing has been wiped out.

Following is the condition of the books of the treasurer on July 1, 1914:

Receipts	$2,076.36
Disbursements	1,841.32
Cash on hand July 1, 1913	72.24
Cash on hand July 1, 1914	235.06

We had on July 1, 1914, approximately $435 in outstanding bills.

You will notice that after these outstanding bills are paid there remains a deficit of approximately $200. As stated above, this has been taken care of by our sustaining members.

GENERAL PAPERS.

A paper, PROGRESS IN THE NOMENCLATURE OF ALLOYS, by Dr. G. H. Burgess, of the Bureau of Standards, Washington, D. C., was read by title and elicited some discussion. That of C. P. Karr, associate of Dr. Burgess at the Bureau, was as follows:

DISCUSSION.

Dr. Burgess calls attention to the attitude of the British Institute of Metals towards the subject, and it must be admitted that what they have done is a decided step in advance, and I believe that we need have no hesitation in accepting their viewpoint so far as they have gone; the vital point is that the work should be continued until all of the general type of alloys shall have been included.

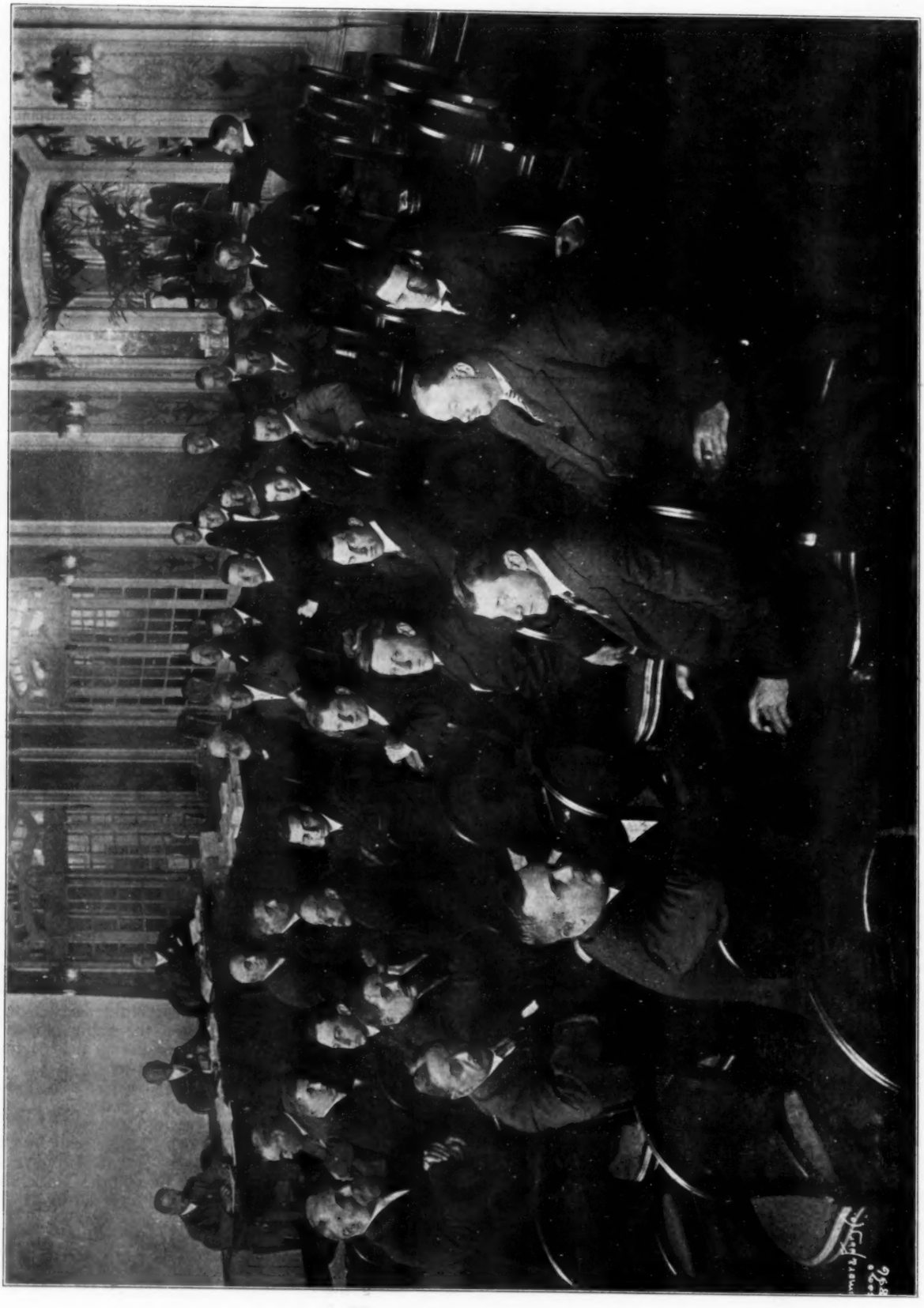
In reference to the term "composition" as used by me in the paper on the same subject last year, a word of explanation may be of interest. As is well known the word "composition" as used in American foundries is almost synonymous with the alloys of the red metal group; in other respects it had a sort of composite meaning, it referred to a class of metals very largely in use which were neither a true brass nor a true bronze, but might be a little of both, and it became by usage a convenient name to express an alloy of doubtful character, or of a miscellaneous series of elements. As used by myself it was probably too generic, and could not in any way individualize an alloy as to its relative position or positive systematic grouping, so that now it seems to me to be preferable to recognize the words *brass* and *bronze*, respectively, as true generic types, and to refer to other alloys bordering on either type by a suitable name which would assign any given alloy to its proper place in the systematic grouping.

Dr. Guertler's suggestions are of interest so far as they refer to the nomenclature to be followed in metallographic constituents, but his propositions will have to be more fully studied and harmonized with the general system before being considered for adoption.

Remarks were also made by a number of members prominent among them being President Clamer, Secretary Corse, Dr. H. W. Gillett, of the Bureau of Mines; N. K. B. Patch, of Lumen Bearing Company, Buffalo, N. Y., and Phillip Mueller, of the Mueller Manufacturing Company, Decatur, Ill. After quite lengthy discussion a resolution was finally passed referring the matter to the executive committee with power to act. It was also suggested by Mr. Patch that the institute confer with the British Institute of Metals on the subject, with a view of coming to a mutual understanding, the meeting, however, failed to appoint a delegate to go to London for this purpose. Other papers read were: SOME RECENT APPLICATIONS OF METALLIC COBALT, by D. B. Browne; DROP POURING PROCESS OF CASTING, by E. A. Barnes; BULL RUN TALC, by J. L. Jones, read by title (published in this issue of THE METAL INDUSTRY); MODERN DIE CASTING PRACTICE, by Charles Pack, and DIE CAST ALUMINUM, by A. B. Norton, read by H. W. Gillett.

ROLLING MILLS, PHYSICAL AND CHEMICAL TESTING.

Wednesday's afternoon session was devoted to rolling mills and testing methods. The first paper was read by the secretary of the CARE AND CONVERSION OF ROLLING MILL SCRAP, by W. W. Rogers, of the Riverside



A VIEW OF A SESSION OF THE AMERICAN INSTITUTE OF METALS, HOTEL LA SALLE, CHICAGO, ILL., SEPTEMBER 11, 1914.

Metal Company, Riverside, N. J. This paper is published in this issue of THE METAL INDUSTRY. A BRIEF VISIT TO A BRASS ROLLING MILL, by E. J. Dutsche, was read by title. Two papers by A. B. Norton on A HOT-SHORTNESS TESTING MACHINE FOR ALUMINUM ALLOYS AND MAKING ALUMINUM TEST SPECIMENS ON CASTINGS were read by Dr. H. W. Gillett, who explained that the results given in the first of the above papers were due to experiments which he himself had helped to carry on in order to devise a machine for measuring the strength of metals during the solidification period. The machine described in the paper was developed in 1911 and has been in use at the Aluminum Castings Company ever since. The second paper describes a method in use by the same company for the making of test bars on castings.

A paper by Dr. Jonson, metallurgist of the New York Board of Water Supply, which told of tests he had made to determine the cause of failure of cold worked manganese bronze aroused considerable discussion. The gist of this discussion indicated that the season cracking and other failures of this material was a matter which could be remedied or avoided by mechanical treatment. Other papers read at this session were as follows: STANDARD TEST BARS OF THE ZINC-BRONZE 2ZN—10 SN—88 CU., by C. P. Karr. This paper is a resumé of Mr. Karr's work for the past year on this subject for the Bureau of Standards at Washington, D. C. A complete account of this investigation will be issued subsequently as a Technologic Paper of the Bureau. A paper on A NEW METHOD FOR THE DETERMINATION OF ZINC IN ALLOYS, by G. E. Lundell and Mai Kim Bee and one on BRINNELL HARDNESS TESTING OF NON-FERROUS ALLOYS, by V. Skillman, closed the program for the day.

The latter paper gives some interesting figures of tests made on the hardness of non-ferrous metals. The author comes to the conclusion that the relation between the Brinnell machine and the Scleroscope cannot be accurately determined for all classes of alloys.

METALLURGY AND METALLOGRAPHY.

Thursday morning was devoted to papers and discussion on the above subject. THE COMMERCIAL CLASSIFICATION OF COPPER, written by Lawrence Addicks, was read by the secretary and gives in a clear and concise manner about all the information that the average consumer of the metal needs to know. SPELTER MANUFACTURE AND PROPERTIES, by G. C. Stone, gave a detailed discription of the manufacture of zinc in cast form and was well illustrated by means of lantern slides. METALLURGY OF TIN AND ANTIMONY, by W. A. Cowan, told some interesting facts about these two metals and furnished some lantern slides showing identification marks on various brands and also gave results of careful chemical analyses. TERNARY ALLOYS OF COPPER, TIN AND ZINC, by S. L. Hoyt, and THE EFFECT OF REPEATED MELTING OF COPPER, by F. O. Clements, closed the session. The latter paper will be found in this issue of THE METAL INDUSTRY.

MELTING PRACTICE.

Thursday's afternoon session was taken up with papers on melting brass in electric furnaces and a great deal of valuable information was imparted both from the papers and the statements made by those present. The foundry man looking for light on this important subject could not but feel encouraged that the day of the electric furnace, while not here yet, is near. In the opinion of the experts present it will be only a short time before this type of furnace will be a commercial possibility. The papers dealing with the subject were: TESTS OF ELECTRIC FURNACES FOR BRASS FOUNDRY, by Herbert G. Dorsey; ELECTRIC FURNACE FOR MEDIUM TEMPERATURE, by E. M. Schmelze; ELECTRIC BRASS MELTING FROM THE CENTRAL STATION VIEWPOINT, by H. M. St. John.

The session of Friday morning after the reports of the committees on Constitution and Nomination had been received and acted upon was given up also to melting practice and the following papers were read and discussed: MELTING LOSSES IN ELECTRIC BRASS FURNACES, by H. W. Gillett and J. M. Lohr; USE OF PRODUCER GAS IN MELTING YELLOW BRASS, by E. B. Guenther; TEST OF NATURAL GAS FIRED FURNACES UNDER FACTORY CONDITIONS, by Fred L. Wolf and Robert B. Burr; ELECTRIC BRASS MELTING, by G. H. Clamer and Carl Hering; PYROMETERS FOR MELTING BRASS AND BRONZE, by H. W. Gillett.

ELECTION OF OFFICERS FOR 1915.

The result of the election of officers for 1915 was as follows:

President, G. H. Clamer, Ajax Metal Company, Philadelphia, Pa.

Secretary-Treasurer, W. H. Corse, Titanium Alloy Company, Niagara Falls, N. Y.

Vice Presidents: Fred. Moerl, Pullman Company, Chicago, Ill.; W. H. Bassett, American Brass Company, Waterbury, Conn.; Jesse L. Jones, Westinghouse, Electric and Mfg. Company, Pittsburgh, Pa.; E. B. Horne, Packard Motor Car Company, Detroit, Mich.; R. B. Wallace, National Cash Register Company, Dayton, Ohio; W. H. Harris, Canada Metal Company, Toronto, Ontario; Robert Job, Milton Hersey and Company, Montreal, Quebec. George C. Stone, New Jersey Zinc Company, New York, J. G. Kasjens Brass Foundry Company, Peoria, Ill.; H. W. Gillett, Bureau of Mines, Ithaca, N. Y.

AMERICAN FOUNDRYMEN'S 1915 OFFICERS.

The American Foundrymen's Association elected the following for 1915.

President, R. A. Bull, Commonwealth Steel Company, Granite City, Ill.

Secretary-Treasurer, A. O. Backert, Cleveland, Ohio.

Vice Presidents: H. A. Carpenter, General Fire Extinguisher Company, Providence, R. I.; Walter Wood, R. D. Wood and Company, Philadelphia, Pa.; S. B. Chadsey, Massey Harris Company, Ltd., Toronto, Ont.; T. W. Sheriff, Sheriff Manufacturing Company, Milwaukee, Wis.; J. P. Peroult, Missouri Malleable Iron Company, East St. Louis, Mo.; Alex. T. Drysdale, Sheffield Castings and Pipe Foundry Company, Sheffield, Ala.; J. J. Wilson, Cadillac Motor Company, Detroit, Mich.; A. H. Thomas, Buckeye Steel Castings Company, Columbus, Ohio; H. E. Field, Wheeling Mold and Foundry Company, Wheeling, West Va.; B. O. Fuller, Westinghouse Electric and Mfg. Co., Cleveland, Ohio.

ASSOCIATED FOUNDRY FOREMEN.

The following will serve for 1915:

President, Robert McDonald, Samuel Moore's Sons, Elizabeth, N. J.

Vice-President, J. A. Loucks, J. Crosswell, Philadelphia, Pa.

Secretary-Treasurer, Robert B. Thompson, 78 Ver Planck street, Buffalo, N. Y.

GOLD PRODUCTION IN BRITISH INDIA.

It is stated that the production of the gold mines of India during the first six months of 1914 amounted to 293,577 ounces, as compared with 289,991 ounces during the corresponding period of 1913.

THE FOUNDRY AND MACHINE EXHIBITION COMPANY

A List of the Exhibitors and What They Exhibited at Chicago, Ill., September 5 to 11, 1914.

ACME MACHINE TOOL COMPANY, Cincinnati, O.
Geared Head Flat Turret Lathe, Motor Driven.

THE AJAX METAL COMPANY, Philadelphia, Pa.
Metals and Alloys.

THE AMERICAN TOOL WORKS CO., Cincinnati, O.
Lathes, Shapers, Planers, Drills, etc.

ARCADE MANUFACTURING COMPANY, Freeport, Ill.
Modern Molding Machines, Sand Sifters, etc.

ARMSTRONG-BLUM MFG. COMPANY, Chicago, Ill.
Hack Saws, Punches, Shears, etc.

E. C. ATKINS & CO., Indianapolis, Ind.
Metal Saws, Hack Saws.

AYER & LORD TIE COMPANY, INC., Chicago, Ill.
Creosoted Wood Blocks for Flooring Purposes.

BAKER BROTHERS, Toledo, O.
Drilling Machines, Keyway Cutting Machines.

BARBER-COLMAN COMPANY, Rockford, Ill.
Hobs, Hobbing Machine and Milling Cutters.

BARNES DRILL COMPANY, Rockford, Ill.
All Geared Drill Press, with positive oiling device.

BENJAMIN ELECTRIC MFG. COMPANY, Chicago, Ill.
Safety and Efficiency Devices, Signal Systems, Etc.

BERKSHIRE MFG. COMPANY, Cleveland, O.
Molding Machines, Vibrators, Flasks, etc.

CHARLES H. BESLY & CO., Chicago, Ill.
Pattern-Makers' Disc Grinder (Motor Driven).

S. BIRKENSTEIN & SONS, Chicago, Ill.
Metals and Alloys.

BLYSTONE MFG. COMPANY, Cambridge Springs, Pa.
Core Sand and Facing Mixer.

BROWN SPECIALTY MACHINERY CO., Chicago, Ill.
Core Machines, Duplex Shaker.

BROWN & SHARPE MFG. COMPANY, Providence, R. I.
Milling Machines, Grinders, etc.

BUCH FOUNDRY EQUIPMENT CO., Bridgeport, Pa
Molding Machines, Flasks, etc.

THE BUCKEYE PRODUCTS COMPANY, Cincinnati, O.
Foundry Supplies.

CANADA CARBIDE SALES COMPANY, Chicago, Ill.
Calcium Carbide.

CARBORUNDUM COMPANY, Niagara Falls, N. Y.
Carborundum and Aloxite Products.

CATARACT REFINING & MFG. COMPANY, Buffalo, N. Y.
Core, Parting Cutting Compounds.

CENTRAL IRON WORKS, Quincy, Ill.
Foundry Equipment.

CHICAGO PNEUMATIC TOOL COMPANY, Chicago, Ill.
Pneumatic Hammers, Drills, Rammers, etc.

CHICAGO PULLEY & SHAFTING COMPANY, Chicago, Ill.
Ball Bearings, Steel Pulleys.

CHICAGO STEEL FOUNDRY COMPANY, Chicago, Ill.
Steel Castings.

CINCINNATI BICKFORD TOOL CO., Cincinnati, O.
Upright Drill, Plain Radial Drill.

CINCINNATI MILLING MACHINE CO., Oakley, Cincinnati, O.
Milling Machine, Tool Grinder, etc.

CINCINNATI PLANER COMPANY, Cincinnati, O.
Heavy Pattern Cincinnati Planer.

THE CINCINNATI PULLEY MACHINERY COMPANY, Cincinnati, O.
Drill Presses, Motor Driven.

CHARLES J. CLARK, Chicago, Ill.
The Clark Blast Meter.

JAMES CLARK, JR., ELECTRIC CO., INC., Louisville, Ky.
Drills, Grinders, etc.

THE CLEVELAND PNEUMATIC TOOL CO., Cleveland, O.
Drills, Hammers, Rammers, Grinders, etc.

CLEVELAND WIRE SPRING COMPANY, Cleveland, O.
Foundry Equipment.

COBURN TROLLEY TRACK MFG. CO., Holyoke, Mass.
Overhead Monorail.

COLBURN MACHINE TOOL COMPANY, Franklin, Pa.
Drill Press, Boring Mill.

COWAN TRUCK COMPANY, Holyoke, Mass.
Cowan Transveyors.

CURTIS PNEUMATIC MACHINERY CO., St. Louis, Mo.
Foundry Cranes, Air Compressor, etc.

WM. DEMMLER & BROS., Kewanee, Ill.
Molding Machine, Air Compressor, Core Machines.

DIAMOND MACHINE COMPANY, Providence, R. I.
Grinders, Automatic Surface Grinder.

JOSEPH DIXON CRUCIBLE COMPANY, Jersey City, N. J.
Crucibles and miscellaneous refractory articles.

F. A. DOWNERD, Columbus, Ohio.
Molding Sands.

G. T. EAMES COMPANY, Kalamazoo, Mich.
Compound Mandrel or Arbor Presses.

EDGEMONT MACHINE COMPANY, Dayton, O.
Friction Clutches.

E. L. ESSLEY MACHINERY COMPANY, Chicago, Ill.
Machinery.

FEDERAL FOUNDRY SUPPLY COMPANY, Cleveland, O.
Molding Machines.

FELT & TARRANT MFG. COMPANY, Chicago, Ill.
Comptometer Adding and Calculating Machines.

FLEXIBLE STEEL LACING COMPANY, Chicago, Ill.
Steel Belt Lacing, Belt Fasteners.

S. FREEMAN & SONS MFG. COMPANY, Racine Wis.
Molding Machines.

GARDEN CITY SAND COMPANY, Chicago, Ill.
Molding Sand, Fire Brick.

GARDNER MACHINE COMPANY, Beloit, Wis.
Disc Grinders, Machines, etc.

GARVIN MACHINE COMPANY, New York, N. Y.
Monitor Lathe and Automatic Tapping Machine.

GENERAL ELECTRIC COMPANY, Schenectady, N. Y.
Air Compressor, Arc Welding Set, etc.

GISHOLT MACHINE COMPANY, Madison, Wis.
Chucking Lathe, Tool Grinder, Reamer, etc.

GOLDSCHMIDT THERMIT COMPANY, New York, N. Y.
Carbon Free Metals and Ferro Alloys.

GOULD & EBERHARDT, Newark, N. J.
Gear Hobbing Machine, Shaper.

GREAT WESTERN MFG. COMPANY, Leavenworth, Kan.
Combs' Gyratory Foundry Riddles.

GREAT WESTERN SMELTING & REFINING COMPANY, Chicago, Ill.
Metals and Alloys.

GREAVES-KLUSMAN TOOL COMPANY, Cincinnati, O.
All-Geared Head Engine Lathe.

F. A. HARDY & CO., Chicago, Ill.
Safety Glasses and Eye Protectors.

BENJ. HARRIS & CO., Chicago, Ill.
Ingot Brass and Scrap Metals.

THE HAYWARD COMPANY, New York, N. Y.
Hayward Electric Motor Clam Shell Bucket, etc.

HEALD MACHINE COMPANY, Worcester, Mass.
Wet Cylinder Grinder, Wet Ring Grinder, etc.

HENION & HUBBELL, Chicago, Ill.
Smooth-On Iron Cements, Fire Brick Cement.

HERMAN PNEUMATIC MACHINE CO., ZELIENOPLE, PA.
Molding Machine, etc.

HILL-BRUNNER FOUNDRY SUPPLY CO., CINCINNATI, O.
Magic Metal Core Boxes.

HILL & GRIFFITH COMPANY, CINCINNATI, O.
Foundry Supplies.

INDEPENDENT PNEUMATIC TOOL CO., CHICAGO, ILL.
Thor Piston Air Drills, Pneumatic Portable Grinders.

INTERNATIONAL ELECTRIC TOOL CO., MILWAUKEE, WIS.
Electric Vibrators of different types.

INTERNATIONAL MACHINE TOOL CO., INDIANAPOLIS, IND.
Libby New Type Turret Lathe.

INTERNATIONAL MOLDING MACHINE CO., CHICAGO, ILL.
Molding Machines, etc.

JANESVILLE WISCONSIN MOLDING SAND COMPANY, JANESVILLE, WIS.
Molding Sand.

KELLER PNEUMATIC TOOL CO., FOND DU LAC, WIS.
Rammers, Chipping Hammers, Drills and Appliances.

JULIUS KING OPTICAL COMPANY, CHICAGO, ILL.
Safety Eye Protectors, Helmets for Welders, etc.

KNICKERBOCKER COMPANY, JACKSON, MICH.
Morse Rarefied Dust Collector.

LANDIS MACHINE COMPANY, WAYNESBORO, PA.
Bolt Cutter, Pipe Die Heads, etc.

LA SALLE MACHINE & TOOL COMPANY, LA SALLE, ILL.
Grinder with Micrometer Adjustment.

LODGE & SHIPLEY MACHINE TOOL CO., CINCINNATI, O.
Engine Lathe, Tool Room Lathe.

J. R. LONG & CO., AKRON, O.
Machinist Vises, Pipe Reamers, Pipe Cutters.

DAVID LUPTON'S SONS COMPANY, PHILADELPHIA, PA.
Sash and Operating Device.

MACLEOD COMPANY, CINCINNATI, O.
Foundry Equipment.

MAHR MFG. COMPANY, MINNEAPOLIS, MINN.
Boiler Shop and Foundry Torches.

MANUFACTURERS' EQUIPMENT CO., CHICAGO, ILL.
Aero Chucks, Collapsible Taps and Parts.

MARSHALL & HUSCHART MACHINERY COMPANY, CHICAGO, ILL.
Lathes, Drills, Milling Machine, etc.

J. S. McCORMICK COMPANY, PITTSBURGH, PA.
General Foundry Supplies.

METALS COATING CO. OF AMERICA, CHICAGO, ILL.
Schoop Metal Spraying Pistol.

MIDLAND MACHINE COMPANY, DETROIT, MICH.
Molding Machines.

THE MONARCH ENGINEERING & MFG. COMPANY, BALTIMORE, MD.
Melting Furnaces, Core Ovens, etc.

MONARCH MACHINE COMPANY, SIDNEY, O.
Engine Lathes, etc.

MOTT SAND BLAST MFG. COMPANY, CHICAGO, ILL.
Sand-Blast Barrel, Dust Collector, etc.

MUMFORD MOLDING MACHINE COMPANY, CHICAGO, ILL.
Molding Machines.

NATIONAL MACHINERY COMPANY, TIFFIN, O.
Bolt Cutter, Die Sharpener, Open Die Head.

THE NEWPORT SAND BANK COMPANY, NEWFORT, KY.
Molding Sand.

NORTON COMPANY, WORCESTER, MASS.
Grinding Wheels, Grinding Machines.

S. OBERMAYER COMPANY, CHICAGO, ILL.
Foundry Supplies.

OSBORN MANUFACTURING COMPANY, CLEVELAND, O.
Molding Machines.

PANGBORN CORPORATION, HAGERSTOWN, MD.
Sand-Blast Equipment, etc.

E. O. PARTRIDGE, CHICAGO, ILL.
Partridge Grinders.

J. W. PAXSON COMPANY, PHILADELPHIA, PA.
Foundry Equipment.

PEERLESS PARTING COMPANY, OTTAWA, ILL.
Parting Compound, etc.

PICKANDS, BROWN & CO., CHICAGO, ILL.
Solvay Coke.

HENRY E. PRIDMORE, CHICAGO, ILL.
Molding Machines.

ROBESON PROCESS COMPANY, PENNINGTON, N. J.
"Glutrin."

ROCKFORD DRILLING MACHINE CO., ROCKFORD, ILL.
Drilling Machines.

ROCK ISLAND MFG. COMPANY, ROCK ISLAND, ILL.
Vises—all kinds.

ROGERS, BROWN & CO., CINCINNATI, O.
Pig Iron, Coke, Ferro Manganese, Fluor Spar.

SAND-MIXING MACHINE COMPANY, NEW YORK, N. Y.
Self-Propelled Sand-Cutting Machines.

SHEPARD ELECTRIC CRANE & HOIST COMPANY, MONTOUR FALLS, N. Y.
Monorail Electric Hoist.

SKINNER CHUCK COMPANY, NEW BRITAIN, CONN.
Full line of Chucks.

W. W. SLY MFG. COMPANY, CLEVELAND, O.
Sand-Blast Mills, Tumbling Mills, etc.

R. P. SMITH & SONS COMPANY, CHICAGO, ILL.
Safety Shoes for Molders and Foundrymen.

SPEEDER MOLDING MACHINE COMPANY, ROCKFORD, ILL.
New Molding Machine.

STERLING WHEELBARROW COMPANY, MILWAUKEE, WIS.
Flasks, Wheelbarrows, Trucks, etc.

FREDERIC B. STEVENS, DETROIT, MICH.
Foundry Supplies.

R. R. STREET & CO., INC., CHICAGO, ILL.
Tools, Roller Bearings, Pulleys, Micrometers, etc.

TABOR MANUFACTURING COMPANY, PHILADELPHIA, PA.
Molding Machines.

TEMPLETON, KENLY & CO., LTD., CHICAGO, ILL.
Simplex Emergency Jacks.

TITANIUM ALLOY MFG. COMPANY, NIAGARA FALLS, N. Y.
Copper, Bronze and Brass Castings.

U. S. ELECTRICAL TOOL COMPANY, CINCINNATI, O.
Electric Drills and Grinders.

UNITED STATES GRAPHITE COMPANY, SAGINAW, MICH.
Graphite Compounds.

VANADIUM-ALLOYS STEEL COMPANY, CHICAGO, ILL.
High-Speed Steel.

H. S. VROOMAN, CHICAGO, ILL.
Sand Screen, Molding Sand, Fire Brick, Fire Clay.

VULCAN ENGINEERING SALES CO., CHICAGO, ILL.
Foundry Equipment.

J. D. WALLACE, CHICAGO, ILL.
Wallace Bench Planer.

WARNER & SWASEY COMPANY, CLEVELAND, O.
Lathes, Screw Machines.

WESTINGHOUSE ELECTRIC & MFG. COMPANY, EAST PITTSBURGH, PA.
Welding Outfits, Motors, Generators and Switchboards.

WHITING FOUNDRY EQUIPMENT CO., HARVEY, ILL.
Foundry Equipment.

WILMARTH & MORMAN COMPANY, GRAND RAPIDS, MICH.
Wet-Surface Grinders, etc.

E. J. WOODISON COMPANY, DETROIT, MICH.
Foundry Supplies.

T. B. WOOD'S SONS COMPANY, CHAMBERSBURG, PA.
Snap Mold Jackets, Snap Flasks, etc.

THE WYOMING SHOVEL WORKS, WYOMING, PA.
Molders' Shovels and Furnace Scoops.

WERNICKE-HATCHER PUMP CO., GRAND RAPIDS, MICH.
Rotary Air Compressors and Receiver.

THE EFFECTS OF REPEATED REMELTING ON COPPER*

A Report of Some Important Physical Tests Applied to Foundry Practice.

By F. O. Clements.†

The ultimate aim of the non-ferrous metal founder is a high grade product and a diminished scrap pile. Many considerations enter into the production of sound castings. In addition to the melting temperature, the degree of fluidity of the melted metal itself, at a given temperature exerts probably the most decided influence upon the successful outcome of a difficult job. Alloys made in regular practice are frequently overheated, and in some cases burnt. This is done usually from a desire to increase fluidity. Both oxygen and sulphur render many metals and alloys by which they have been absorbed very quickly fluid. Copper alloys are more quickly fluid when they contain oxygen than when free from this element.

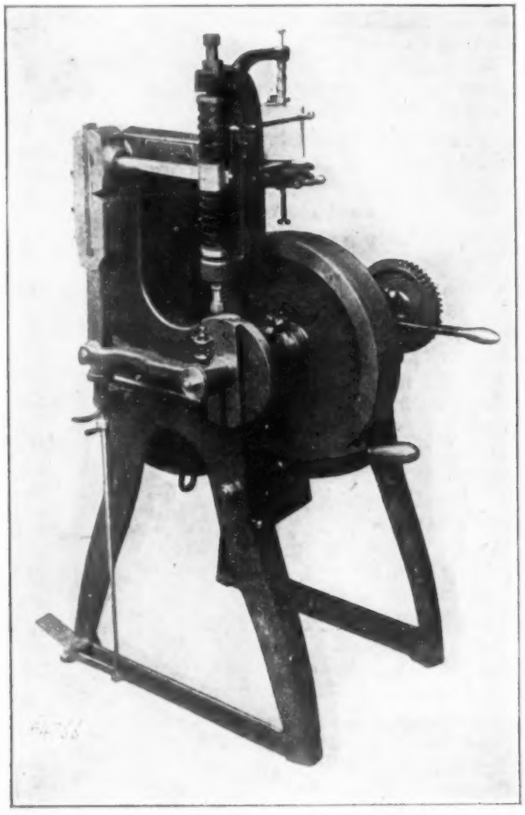


FIG. 1. UPTON-LEWIS TOUGHNESS TESTING MACHINE.
(1) Measures resistance of materials to alternate bends. (2) Produces an autographic record. (3) Detects fibre faults and brittleness. (4) Determines temper as conferred by rolling or other expenditure of energy.
Note.—Spring resistance on this machine.

The customary statement made by foundrymen that repeated remelting of metal very decidedly injures the casting properties, would be granted, without question, by every practical foundryman. It seemed advisable, however, to devise a series of tests that would quantitatively measure the soundness of castings, and thereby give some comparison as to the relative amount of oxygen, and other impurities, absorbed during the melting process.

In considering the various types of physical testing apparatus, the fibre stress or endurance machine developed by Messrs Upton and Lewis, of Cornell University, seemed to most accurately predict the casting conditions. At least the fibre strength revealed on the Upton-Lewis machine has very close correlation to the casting properties. Oxidation makes sluggish metal, and consequent poor fibre. Sluggish metal will not properly fill the mold—an effect still further mechanically affecting the strength of the product. This particular machine produces alternate bends on quickly made test specimens 1-inch wide and of any given thickness, making graphic record of the number of bends and the resistance the part offers to the load, prior to fracture.

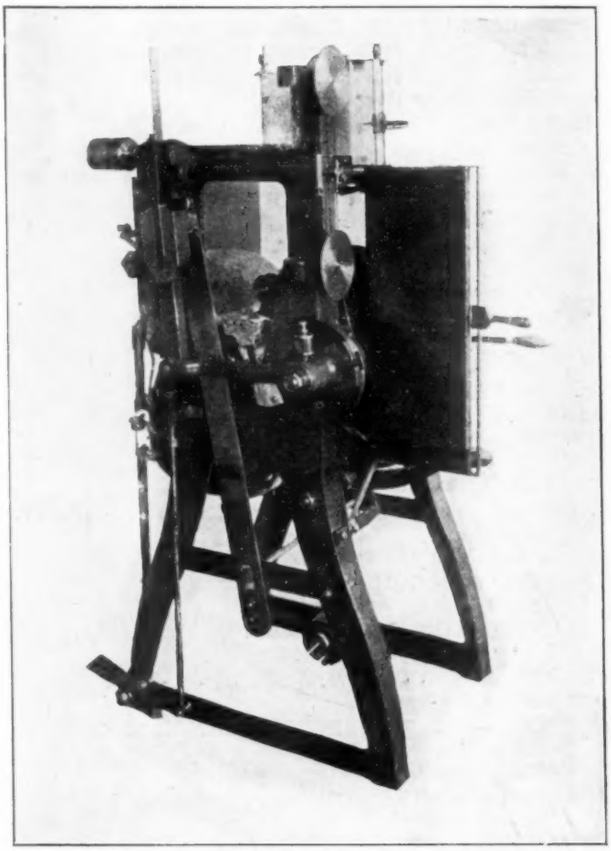


FIG. 2. UPTON-LEWIS MACHINE AS MODIFIED.
Changes consist of pendulum resistance—new autographic device—speed indicator and rheostat to permit speed regulation.

This machine, as originally designed, offered resistance through spring action. This has been modified in the National Cash Register Co.'s laboratories, so that pendulum resistance has been substituted for the springs, permitting loading somewhat in accordance with the sectional area of the test bar itself. The original idea was to select an alloy of known analysis, and submit random samples to the conditions of test. Rather than work a complex alloy, it seemed advisable to confine initial efforts to one metal—copper.

After the completion of the physical tests on the virgin copper as purchased, 100 pounds of the metal was melted under exact foundry conditions, and brought to a satis-

*Paper read at Convention of American Institute of Metals, Chicago, Ill., September 7-11, 1914.

†Chemical Engineer, National Cash Register Company, Dayton, Ohio.

factory casting temperature. This temperature proved to be, in heat No. 1, 1,120 degs. Centigrade. Regular foundry practice was followed in every particular, the metal being kept well covered with charcoal to prevent undue oxidation. This metal was cast into good appearing ingots, which proved very solid throughout. Four samples were machined from a random ingot, and tested for toughness of fibre. The metal, at the same time, was analyzed. The metal was then all reassembled and again remelted at the same temperature as reported heretofore. The second heat resulted in solid ingots, a slight bulge appearing on the top of each.

The third heat seemed sluggish and the temperature of the metal was raised to 1,165 degs. Centigrade. The

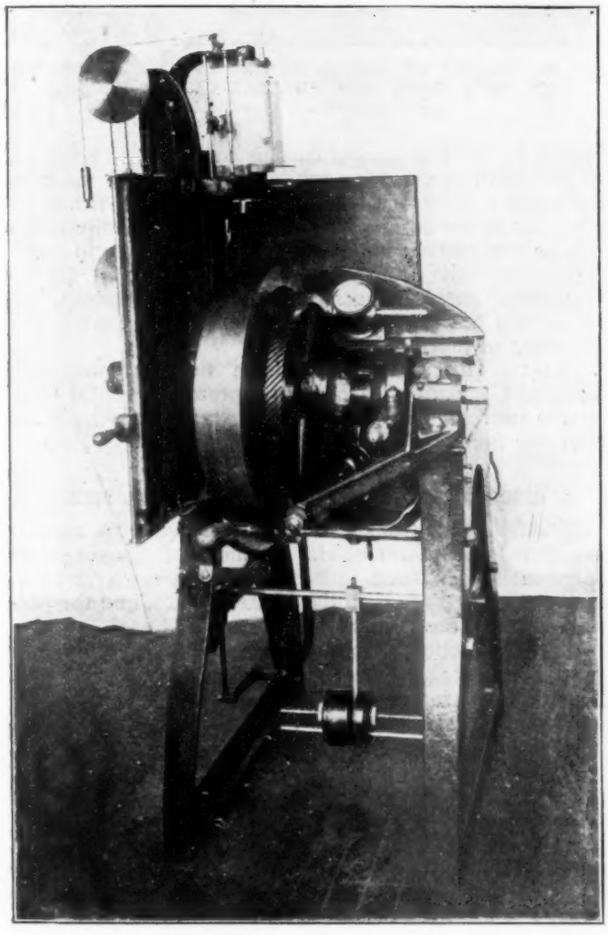


FIG. 3. ANOTHER VIEW OF THE MODIFIED UPTON-LEWIS TOUGHNESS TESTING MACHINE, SHOWING THE PENDULUM RESISTANCE.

ingots had bad exterior, containing blow holes to the depth of one inch (1″). The metal was very spongy and unreliable.

In the fourth heat, the metal recovered from the various operations was again remelted and cast at a temperature of 1,115 degs. Centigrade. The ingots were very spongy and full of blow holes; in fact, the metal was so unreliable that it was almost impossible to machine test bars that gave any indication, whatsoever, of good features. The breaks showed discolorations and badly oxidized spots.

The data obtained from the chemical and physical tests are to be found in the following table.

PHYSICAL DATA.

	Virgin Metal.	First Heat.	Second Heat.	Third Heat.	Fourth Heat.	Boron Sub-oxide.	Sample of Boronized Copper Cast Under Ideal Conditions.
A. B....	1,515	850	845	762	334	2,007	3,044
R.....	100%	97%	96%	96%	96%	103%	117.5%
B.....	2.7%	5.5%	4.9%	8.5%	22.6%	2.7%	0.74%

CHEMICAL DATA.

Copper..	99.78%	99.59%	99.49%	99.43%	99.39%	99.56%
Lead....	None	Trace	Trace	Trace	Trace	Trace
Sulphur.	0.03%	0.06%	0.08%	0.11%	0.13%	0.08%

KEY TO MARKINGS.

A. B.—Average number of alternate bends.

R.—Resistance offered by test bar to the bend, given in percentage, assuming the virgin metal to be 100 per cent.

B.—The percentage of drop-off of resistance in 10-inch lengths, measured on the diagram.

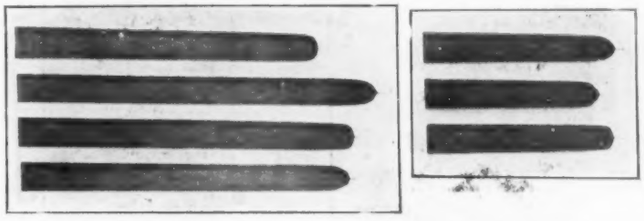


FIG. 4. VIRGIN COPPER—SPECIMENS CUT FROM INGOTS.
Total alternate bends (average) 1515.

FIG. 5. FIRST HEAT—METAL REMELTED AND CAST AT TEMPERATURE OF 1120 DEGS. C.
Total alternate bends (average) 850.

It might be well to say that the toughness of the material is in direct proportion to the length of the diagram (the number of alternate bends), while the hardness or softness can be judged by the width of the diagram, at any one point. We have, arbitrarily, taken a point ten inches (10″) from the application of the stress, and made a comparison with the virgin copper as a standard.

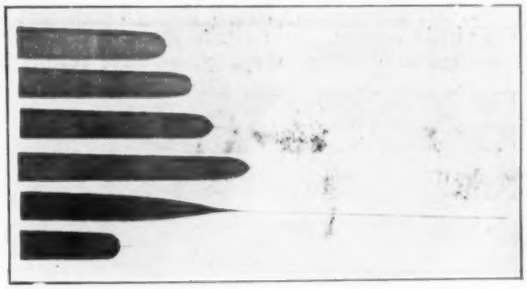


FIG. 6. SECOND HEAT—METAL REMELTED AND CAST AT TEMPERATURE OF 1120 DEGS. C.
Total alternate bends (average) 845.

METHOD USED IN DETERMINING SULPHUR CONTENT OF COPPER.

Sulphur determinations were made by the method described by Gustav Thurnauer in the Journal of Industrial and Engineering Chemistry, 1910, briefly abstracted: One gram of one hundred mesh sieve filings are thoroughly mixed with two parts of potassium chlorate and one part sodium carbonate and fused in an iron crucible. The fusion after cooling is digested with hot water and the sulphate salts extracted. Proper acidulation with hydrochloric acid and precipitation with barium chloride puts

the sulphur in form for customary determination. All reagents were carefully tested prior to making the determination as given in this paper. We do not wish to pass on the method at the present time.

The question naturally arises, can a metal in such injured condition be deoxidized and restored to its former condition?

Every foundryman recognizes the advantages derived from fluxes. The use of fluxes or the benefits to be obtained therefrom to our knowledge have never been quantitatively determined.

The last two sets of figures included in the table show very conclusively the value of boron suboxide as a flux. Following the directions of The General Electric Co., two ounces of boron suboxide were added to 16 pounds of the badly injured metal. The copper was heated to 1,260

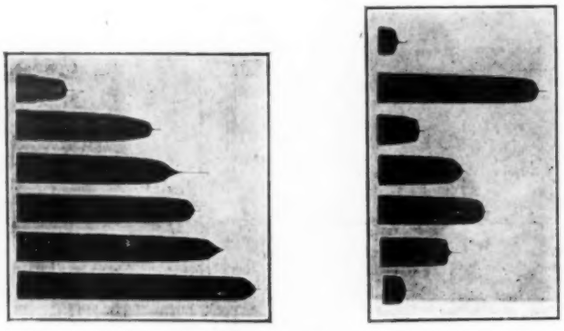


FIG. 7. THIRD HEAT—METAL REMELTED A THIRD TIME—TEMPERATURE 1165 DEGS. C.
Total alternate bends (average) 762.

FIG. 8. FOURTH HEAT—CASTING TEMPERATURE 1115 DEGS. C.
Total alternate bends (average) 334. Metal badly oxidized.

degs. Centigrade, in order to secure the best results from this particular flux. The metal was then allowed to cool down to a casting temperature of 1,149 degs. Centigrade, and again cast into ingot form. The ingots had a good appearance, were solid, and the fibre seemed remarkably close, as is evidenced by the results obtained on the endurance machine. The diagrams produced were slightly irregular, but considerably longer than all others, including the virgin copper. Still again, through the courtesy of The General Electric Company, we have results from

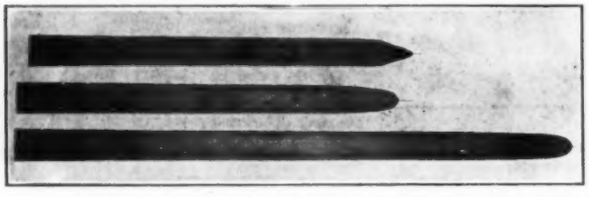


FIG. 9. THE BADLY DAMAGED METAL FROM THE FOURTH HEAT WAS TREATED WITH BORON SUBOXIDE. THIS FLUX COMPLETELY RESTORED THE METAL.
Total alternate bends (average) 2007.

a small casting of boronized copper produced under ideal conditions.

The copper was both melted and cast in a vaccum. No admission of air during the entire process. Such a process with electric source of heat and boron suboxide as a flux permits absolutely no contamination from oxygen and sulphur. High quality fibre should be the result.

A large number of additional tests have been made with various fluxes common to the non-ferrous industry, with results that are, in many cases, startling. In other words, we now have a method of determining whether we are using the right flux for our own particular type of work; whether we are wasteful and using more than is necessary, or whether our usage has been too small in amount to perfectly clean the metal, and thereby obtain the highest degree of fluidity. This fluidity is the crux of the situation and has decided bearing upon economical foundry practice.

The work done on the fluxes thus far, is very promising, and the results obtained will appear in another paper on the general subject of "Fluxes." The boron suboxide result was added to this paper simply to show that material severely injured in melting can, by proper flux-

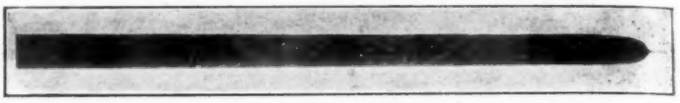


FIG. 10. SAMPLE OF COPPER, MELTED IN VACUUM, DEOXIDIZED WITH BORON SUBOXIDE, AND CAST IN VACUUM.
Total alternate bends (average) 3044.

ing, be restored to perfect casting condition. This work as projected seems very prolific of results of value to the entire non-ferrous industry. It is being furthered by a similar series on aluminum, after which definite alloys will be considered; both alloys made from virgin metal and alloys made from scrap. Every avenue of the investigation opens up many side lines for investigation, all of much promise. Another year will permit the collection of much valuable data.

Note: This contribution from the National Cash Register Company's Laboratory represents faithful work on the part of many men on the staff, in co-operation with our foundry, to whom all credit is due.

PRICE OF PUMICE AND AMERICAN DEPOSITS.

The following translation of a memorandum appearing in a late bulletin of the Chamber of Commerce of Messina is of interest in considering the general trend of the pumice trade with the United States, and the possible effect of the opening of the Panama Canal.

The importation of pumice from Italy goes back, so far as the Chicago market is concerned, to the year 1894. Importations are made from the Lipari Islands by a few important houses, who have their representatives on the ground. Only pumice in blocks is exported from Italy, which is in turn manufactured in the United States. The price paid for Italian pumice is higher than that paid for the product of other countries. Italian pumice varies in price from 6¾ to 12½ cents per pound, and that from other countries from 2 to 9 cents per pound, at New York. The price at Chicago is about 1 cent higher. Pumice is imported exclusively through the port of New York. There are no manufactories of artificial pumice in the United States; this is imported exclusively from Germany.

The price of pumice imported to the United States in powder form is $17 per metric ton; the price of the local product is about $10 per metric ton. Local pumice stone is produced in the States of Nebraska, Utah and Kansas. In the State of California there are large deposits of the product in a white, powdery state. The cost of producing and marketing it, however, would be such as to preclude putting it on the market at present. It is thought that with the opening of the Panama Canal some company might undertake to develop the industry, the cost of transportation being so greatly reduced. Chicago markets, and those of other Western States, offer a favorable field for the more intense introduction of the article.

THE INFLUENCE OF VARYING CURRENT DENSITIES ON THE ADHESION OF SILVER DEPOSITS TO HIGH NICKEL GERMAN SILVER*

By Frank Mason.

A problem which, at least, has been of some interest to manufacturers and also to many large buyers of high-class electro plate for some little time, is the peculiar behavior of thick deposits of silver on some grades of German silver. This matter was brought before the Institute of Metals about three years ago by two Sheffield investigators who, after much research, confined the trouble to German silver containing a high percentage of nickel. German silver used in electro plate industries, or nickel silver, as it is sometimes termed, would appear to divide itself into three series of grades.

First, we have the grade which is often made up into the cheap electro plate. This is an alloy only slightly removed from brass by the introduction of a very small percentage of nickel. By giving this alloy a slight coating of silver, the makers of this class of goods are enabled to mark them "E. P. N. S.," meaning, of course, "Electro Plate on Nickel Silver." Technically this is quite correct, but very misleading to many purchasers of electro plate ware. This has been recognized in some quarters, so perhaps it will be of interest to recall at this point that such procedure after January 1, 1914, will be illegal in Canada, and all alloys entering into that country with less than 10 per cent. nickel content must be distinctly marked "BRASS." The second includes German silver containing from 10 per cent. to 18 per cent. nickel. From this alloy the majority of ordinary high-class electro plate is usually manufactured; the nickel, copper and zinc varying, of course, with the article and its use.

The third series is one in which nickel is used to an extent considerably above the ordinary. Often, however, this alloy is used for goods not intended for electro plating. Nevertheless, it is not uncommon for fairly large buyers of plated goods, such as mercantile shipping companies and hotel proprietors and others, to specify their formulæ for the alloy to be used in the execution of their orders, and also their own deposits. Almost invariably it is an alloy of this class, one of high nickel German silver, with a thick, heavy deposit of fine silver. It is this class with which this paper deals. Incidentally one might question the advisability of this procedure of specifying a basis metal of high nickel content and the weight of deposit to obtain advantages or benefits of which some, at least, are more imaginary than real.

In a paper read some time ago before the Institute of Metals, this was amply verified. One feels that the experience of reliable electro plate houses would be the best guide and of great value in judging both metal and deposit most suitable for goods intended for hard wear. While this practice obtains, however, and thick, heavy deposits of high nickel German silver insisted upon, the demand must be met, and much work and attention has, during the last few years, been given to the problem of "peeling" of the deposit on a small proportion of this class of goods. Profiting by the experience and results obtained by other investigators, it has been found that this particular trouble took place only with German silver containing above 18 per cent. nickel.

These tests to which reference will shortly be made, were made on 20 per cent. nickel alloys. The trouble referred to is one which is not in any sense connected with ordinary stripping, as that associated with imperfect cleaning, etc., before plating. It is necessary to emphasize this to correct any misapprehension which might arise with regard to this particular "peeling," because articles not properly treated in the preparatory stages of plating would be found faulty during the subsequent burnishing processes, it being well known that if the slightest trace of grease or oxide is present on the surface of the basis metal, the silver deposit will lift under the pressure of the burnishing tools. The trouble is subsequent to, and is always associated with extraordinary wear; and also in all cases if the silver deposit be freshly peeled from the basis metal, the latter (the metal) is invariably found to be quite clean, and apparently in a perfect state to receive the fine coating of silver. In most plating works' practice it is usual, after thoroughly cleaning the article, to rinse through a solution of mercury, and then to deposit on the article a thin coating of silver quickly. In other works this covering is exceedingly slight, and is technically known as a "tinge" of silver, and this, also, is imparted in a bath, being operated with high-current density.

Briefly expressed, then, the question of tonight resolves itself into one of current densities used in the initial stages of plating. It is obvious to all that the very best and foremost foundations must be used in anything we wish to build upon habitations of silver deposits, and it is of vital importance in electro-plating, especially when dealing with german silver of high nickel content, that the first trace of silver deposit, or foundation, should adhere most tenaciously to the metal if the superstructure is to be perfect. The common procedure in obtaining or depositing this foundation, or first trace of silver, is to use a vat which is set apart exclusively for this purpose, and using a current density of 25 to 30 amperes per square foot, with no external variable resistance in the circuit. The deposit of silver obtained from these conditions is usually non-coherent, and for the most part non-adhesive. Where scratch brushing obtains, this can be operated, and the surface then presents a fairly uniform coating of silver, but it should be borne in mind that, from tests recently carried out, this very fine covering of silver possesses similar tendencies to non-cohesion and non-adhesiveness, though not to the same extent as that deposit which is characteristically dark in color, and is the product of high current density.

Now, if the current density is reduced from 25 or 30 amperes to about ½ or 1 ampere per square foot, a very different silver covering is the result. It is a very fine, close-grained deposit of silver, which is infinitely superior to that produced by means of a high-current density (as that above described), as the foundation for the building up of a thick-wearing deposit such as is required for the 25 to 30 years' hard wear. This is the class of goods on which Sheffield has built its reputation, and is the only class on which tests which form the subject of this evening's paper is intended to refer to.

Test pieces were taken and half-treated in the ordinary way of plating, and half under the above suggested new conditions of current density. They all

*Paper delivered before the Sheffield Society of Applied Metallurgy.

withstood the hard commercial burnishing test which, as previously stated, would have revealed any faulty cleansing before plating. Test pieces of each method were then subjected to very severe bending and breaking tests, the result being most marked. The one deposited by the ordinary method "peeled" to the extent of about ½-inch, and could have been readily stripped from the basis metal from end to end, which is the appearance obtained during hard wear; while the low-current density test pieces did not flinch, but appeared to be part and parcel of the german silver. Other test pieces were taken and filed with a very rough file after being fairly held at both ends in the grips of a vice. The pieces were filed through the deposit to the basis metal with an endeavor to lift some of the remaining portion of the silver deposit. Again, the deposit which was built up upon the foundation produced with a high-current density broke down, while the one on which a current density of ¾-ampere per square foot was used held together intact.

PICKLING GRAY IRON CASTINGS

SOME PRACTICAL SUGGESTIONS AS TO SOLUTIONS AND APPARATUS.

BY FRANKLIN W. HOBBS.

While the tumbling mill and the sand blast will produce a satisfactory surface on some classes of work, there is a large amount of castings which, owing to their shape or size or both, cannot be satisfactorily treated by those methods when both quality of work and cost of production are considered. Pickling will produce first-class results at a minimum cost on all sizes and shapes of castings, provided that the proper chemicals and a suitable arrangement for their use are employed.

Hydrofluoric acid I consider the most satisfactory pickling agent, as it very readily attacks the sand and scale while it dissolves iron very slowly. Sulphuric acid has the disadvantage that it attacks the iron very freely, but does not dissolve the sand, so that in order to remove the sand and scale the iron must be eaten away sufficient to release them, the result being many times an uneven surface because of patches of sand resisting longer at some places than at others where there is less of it. The hydrofluoric acid may be used 1 to 15 stronger if desired, and its action is hastened by warming slightly. I consider ammonia the best neutralizing agent, one pint to fifty gallons of water used hot.

A splendid arrangement consists of four tanks all of the same size, the size being suited to the class and amount of work to be pickled. An overhead track supporting a truck to which a tackle or hoist is attached, for hoisting or lowering the car or cage containing the work. By this arrangement the work is lowered into the first or pickling tank, after the required time it is hoisted and run along the track to the second tank containing clear water, thence to the ammonia tank and lastly to the fourth or hot water tank, from which it is lifted and allowed to dry in the air. The acid and ammonia tanks should be lead-lined and the seams lead-burned, not soldered, as the acid would attack the tin in the solder and cause the tanks to leak.

There is a method by which the seams may be soldered, and if properly done will produce a tank that should remain tight for a long time. A box or form is made which will fit closely into the tank when the lining is in, and the lead is formed over this box, the seams being lapped well and soldered on the outside so that when the lining is in the tank, the only chance the solution has to get at the solder is the very close space in the lap. The solder should be put on quite thick. After the seams are all soldered, the form lead and all is slipped into the tank, the edges bent back over the top and tacked down and the form removed, or if desired it may be allowed to remain as a protection to the lead lining against injury from contact of car or work. The car or cage in which the work is loaded may be made in several ways; if made of wood and nailed or screwed together the nails or screws are destroyed after a while by the acid, allowing the car to fall apart, and if wooden dowels are used they shrink when the car is not in use, and come out. Iron is unnecessarily heavy and brass has the same disadvantage in addition to being expensive for a car.

I will describe the construction of a car that I have found best in which only the supporting bails are iron, the rest being made entirely of soft wood boards. As the bails are made quite heavy they last for a considerable length of time, and being simple are renewed at small expense. The sides and ends of the car are made like an ordinary plating tank, except that where the ends set in grooves in the sides a projection is left on each end of the end pieces which goes through holes bored in the grooves of the sides. The sides are about 2 inches wider than the ends and extend below the ends. The bottom boards fit inside of the sides and extend out under the ends. Grooves are cut in lower edge of sides about one-fourth the length of car from ends. The iron bails fit into these grooves. There are two bails made of round iron which go across the bottom car, up the sides and bend together, where they are welded, forming a triangle except that the sides are at right angles to the bottom up the depth of the car. These swing together over the center of the car to receive the hook from the hoist.

Thus we have a car without a nail, screw or dowel, so constructed that when the bails are on, it cannot get apart. The bails may be protected from the action of the acid by inclosing them in lead pipe, but as it has to be put on before they are formed, it is rather difficult to get them in shape without injury to the lead.

NICKEL-PLATING ALUMINUM.

A communication has just been presented to the Académie des Sciences by M. Le Chatelier, in which the author states that he has succeeded in nickel-plating aluminum. Until now it has been impossible to cover aluminum with any kind of metallic layer by the methods in use. This has considerably prevented the extension of employment of this metal, which lends itself to so many purposes, but its dull appearance, especially after prolonged use, has been much against it. The difficulty has been surmounted by a preliminary scouring of the aluminum in a bath of hydrochloric acid containing a certain proportion of iron. The iron precipitated on the surface of the aluminum forms a kind of network, and when the piece of metal is next passed into the nickel bath the nickel gets entangled, as it were, in this network and adheres strongly to the aluminum. This process, which is based upon an action which is purely physical, appears capable of solving a problem hitherto considered insoluble.

BULL RUN TALC*

A Description of the Various Forms of Foundry Facings.

By Jesse L. Jones.

The use of graphite or plumbago in foundry facings of high quality has been universal in the past, but there has recently been a very remarkable increase in the price of graphite and foundrymen for this reason have been looking for a satisfactory substitute. Ceylon furnishes the bulk of the graphite used in the United States. The easily worked surface deposits of this island have been practically exhausted and the necessity of increase in the depth of the mines with the consequent introduction of mine pumps and modern methods of mining, are some of the reasons given for the increased cost of Ceylon graphite. Ticonderoga, on Lake George, New York, furnishes considerable graphite, but it is not as high in carbon as Ceylon graphite and its satisfactory purification is difficult and expensive. Artificial graphite made in the electric furnace, has been suggested as a substitute for natural graphite, but it has not been very favorably received by foundrymen in general.

Due to the above facts, it is not likely that any substantial reduction in the price of graphite may be anticipated in the near future and any material that will give as good results as graphite is decidedly interesting. Such a material seems to have been found in Bull Run Talc and many brass, gray iron and malleable iron foundries use it exclusively and no longer buy any graphite whatever. In order to make a comparison of these two materials it will be necessary to consider their physical characteristics in connection with their application in the foundry.

CHARACTERISTICS OF GRAPHITE.

Graphite is a form of carbon but as mined it is contaminated with iron oxide, clay, etc. Selected Ceylon lump graphite yields on combustion as low as 3 per cent. of ash and has a specific gravity of 2.256. It occurs in thin flexible, non-elastic leaves that have a greasy feel, a steel gray color and a metallic luster. It is a conductor of heat and electricity, is infusible before the blow-pipe and only burns at a high temperature. The purer lump graphite is generally used for crucible making while facing is made from the chips and dust that give from 14 per cent. ash in the best grades known as "silver lead," up to 60 per cent. ash in the XXX or common grades. Purification by air flotation, acid treatment and other processes is possible, but it adds to the cost of the product and is only used where a very high grade material is absolutely required.

Artificial graphite is very refractory, being made at a high temperature in the electric furnace. It is also uniform in quality. The "A-16XX" grade is 90 per cent. pure and contains 10 per cent. silicon carbide. It is amorphous and looks like ground charcoal. The "P-16XX" grade is 98 per cent. pure and has the appearance of natural graphite.

CHARACTERISTICS OF ORDINARY TALC.

Talc is a hydrous silicate of magnesia, with a composition when pure of silica 63.5, magnesia 31.7 and water 4.8, the water going off only at a red heat. It has a specific gravity of 2.75. Like graphite it occurs in thin, flexible, non-elastic leaves that have a greasy feel. The color is white to greenish with a pearly luster when broken. Talc fuses only at a very high temperature and in a poor conductor of heat. Before heating, it is so soft that it may be scratched by the finger-nail, but after heating it may become hard enough to scratch glass. In this form under the name of "lava" it is used for gas burner tips. Soapstone is the name given to talc when it is in the massive form. It is usually impure and makes a harsh, gritty facing so for this purpose the softer foliated or fibrous forms are used.

CHARACTERISTICS OF BULL RUN TALC.

Brass or iron foundrymen who have used ordinary talc or "soapstone" facings, have found them as a rule very unsatisfactory for the reason that they are washed away or "run" before the molten metal and for this reason can only be used very sparingly on a sand mold if at all. The grade of talc that has come to be known by the name of "Bull Run Talc," when it is properly ground and bolted, has been found to be a cheap and excellent substitute for graphite. It can be "slicked" with a camel's-hair brush or tool, dusted on green sand molds, shaken on brass molds instead of flour or used as a core wash and there seems to be very little danger of running or scabbing.

This deposit of talc has been used in the manufacture of facing since 1907. It is located in Fairfax County, Virginia, near Clifton Station on the line of the Southern Railway. It extends northeast and southwest and has a dip of about 10 degrees toward the west. While it runs down to the historic Bull Run and both armies made encampments and entrenchments there, the remains of which are still to be seen, the actual battlefield was several miles away. The talc has a characteristic red color due to its being stained by iron oxide. It is of the foliated variety and has been compared to fish scales as it crumbles in the hand and when wet slips right out of it. The deposits often seem to be sedimentary veins that have been turned up on edge, but they are really lenses and not true veins. They are usually narrow, being from 6 to 20 feet wide.

The talc is ground with rather slowly revolving, 4 feet diameter French buhrstones and bolted through silk bolting cloth. It is filled into bags of 125 pounds each. The following comparative tests were made of a sample of Bull Run Talc and of ground soapstone:

	Analyses.	
	Bull Run Talc.	Soapstone.
Moisture	.15	.10
Loss on ignition	3.45	2.40
Silica	54.40	57.56
Ferric Oxide	9.54	2.20
Alumina	5.86	4.90
Lime	.60	2.72
Magnesia	27.01	30.36

SIEVE TEST.

	Bull Run Talc.	Soapstone.
20 to 30 mesh	.....	2.80
30 to 50 mesh	.....	7.97
50 to 100 mesh	Trace	23.22
100 to 200 mesh	5.68	26.08
over 200 mesh	94.30	39.93

BRUSHING TEST.

A green sand mold was used for this test, a plain cope being rammed up and divided off in equal squares 9 inches by 9 inches. Next 15 grams of each sample was placed on a square and well brushed into the sand with

*Presented at Convention of American Institute of Metals, Chicago, Ill., September 7-11, 1914.

a camels-hair brush, the residue that could not be brushed in, being weighed.

	Silver lead.	Bull Run talc.	Soapstone.
Amount brushed in ..	88.8	97.9%	78.2%

The soapstone test was really much poorer than indicated for it did not brush into the sand well but gave a

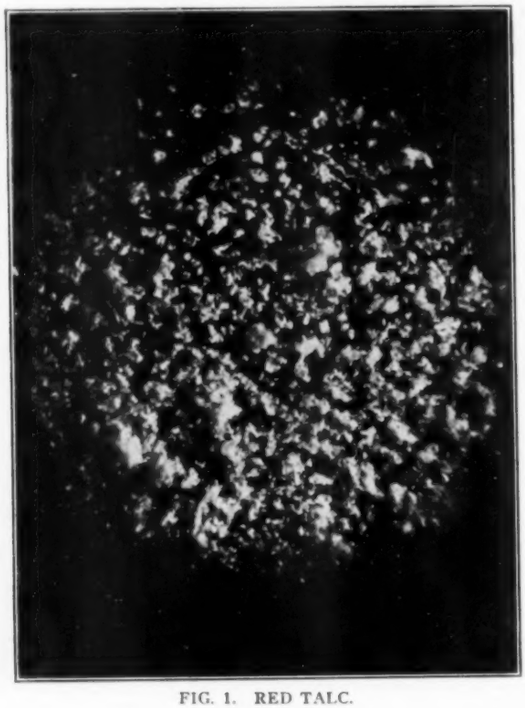


FIG. 1. RED TALC.

rough surface that was balled and matted up. The Bull Run Talc and silver lead each gave a smooth adherent, slippery surface.

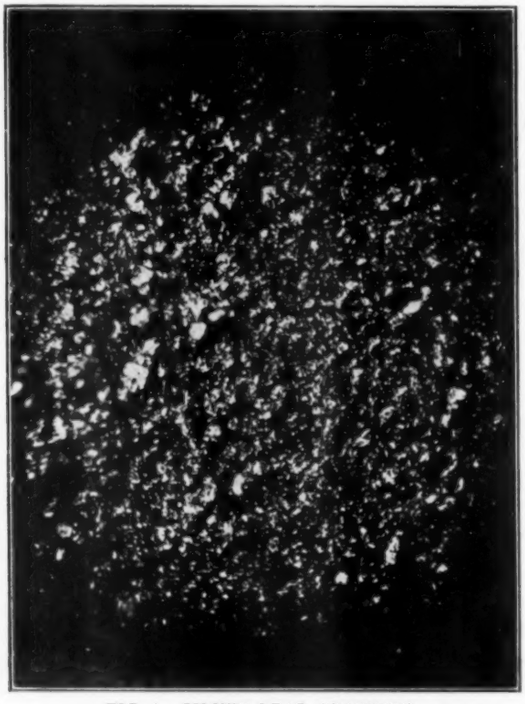


FIG. 2. SILVER LEAD GRAPHITE.

MICROSCOPICAL TEST.

A small amount of each material was placed on a glass slide, the excess removed by gently tapping the inverted slide and a photograph made of the remaining powder that adhered to the slide. In each case the magnification is 25 diameters. Fig. No. 1 shows the Bull Run Talc, Fig. No. 2 the silver lead and Fig. No. 3 the soapstone. The excellence of the Bull Run Talc does not seem to be due to its chemical composition although there seems to be enough clay present to make it very adhesive while the iron oxide may make it more refractory. Its extreme fineness and softness and the removal of the grit by the processes of weathering will account for the results obtained in practical foundry use. The brushing test is an excellent one for facings and by it one can form a good estimate of how valuable or worthless a facing may be.

Graphite being a form of carbon will oxidize when heated to a high temperature in the presence of air. The more finely divided the graphite is, the more readily it

FIG. 3. SOAPSTONE.

will oxidize due to the greater surface exposed. Talc on the other hand is incombustible and there is no limit to the fineness to which it may be ground without impairing its value. In fact, the more finely talc is ground the better it has been found to work in the foundry.

Bull Run Talc gives especially good results on copper castings, phosphor bronze castings and other rather high melting point alloys. It is also satisfactory on gray iron and malleable iron, many foundries buying it in car load lots. On very small work and on the light aluminum alloys it sometimes shows streaks. The reason for this probably is that the heat of the molten metal is not high enough or the facing is not exposed to the heat long enough to harden and compact it. The use of a little molasses water or some similar device ought to overcome this defect.

If the high price of graphite continues, the use of talc ought to increase very greatly, but the foundrymen who desires to get good results ought to test the facings sold to them, very carefully. Extreme softness and extreme fineness are the characteristics that insure successful results.

HOW TO PREPARE AN ANTIQUE GREEN GOLD IMMERSION SOLUTION

SOME REMARKS ABOUT PLATING SOLUTIONS IN GENERAL.

BY HENRY GOLDMAN.

HENRY GOLDMAN.

Certain platers have an idea that all solutions can be made up by just guessing at the different kinds of chemicals which they think can be used to make up the solution. When the plater has these chemicals on hand he uses them to prepare the solutions and this guess work applies equally as well to antique green gold solutions; he terms the finish from such a solution antique green gold partly because the color resembles a green. Exactly how he obtained the color he does not know. Yet when some platers are told that an antique green gold solution can be prepared in a simple manner they laugh just because they have a method of preparing a solution which they think is the very simplest one and should you inform them of an easy way they will still think that by their superior knowledge and years of experience they are proficient enough to give you information upon the subject instead of receiving it.

Other platers when they know that a solution is not in working condition add more chemicals to the solution not knowing which is best for the purpose and the next thing they know is that the solution is a failure. A true fact about solutions is the less chemicals that are put into them the better they will work. The utmost care should be used to see that the correct amounts of chemicals are put into the receptacle as this is the biggest factor in the production of solutions. If a solution is made up and works well, let it alone. This point cannot be emphasized too strongly as it is the backbone of plating, therefore, take the utmost care of it.

To prepare the antique gold immersion solution use the following materials:

Water	1 gallon
Cyanide, 98-99%	6 ounces
Fine gold reduced to a chloride	2 pennyweights
Fine silver reduced to a chloride	3 grains
Powdered White Arsenic	1 grain

Dissolve the cyanide in two-thirds of the water; then add the materials in the order given, except the arsenic. One ounce of the cyanide and a half pint of water, which should be heated to the boiling point, should be reserved for dissolving the arsenic and then finally mix altogether thoroughly. Use the solution at the boiling point as an immersion solution without anodes or current. This is probably one of the very few coloring solutions that can be used without anodes and current. You can tell by the color of the deposit whether you have erred in the correct amounts of chemicals and metals. If there is too much arsenic your solution will work steel gray; if there is too much silver the solution will work like a brass solution, or if the solution is too rich in gold it will work very fast. A great amount of care should be taken when adding arsenic and silver.

The articles to be colored green should have a light smut upon the surface before immersion. This can be done by any of the usual methods such as the acid copper solution or the muriatic acid and copper sulphate smut dip and relieved in the usual manner with sodium bicarbonate or fine sea sand to produce the antique effect.

Articles made from the white metals, antimonial lead or soldered parts should be previously brass or copper plated before immersion. If the deposit is dull it will answer for the smut when relieved as previously mentioned. It is well to keep in mind that if the solution is too rich in metal it will work very fast, if too poor in gold it will work too gray. As a remedy to bring up a normal color it will be advisable to add a little more gold and silver when the solution will again give excellent results.

HOW TO MAKE A BLACK NICKEL SOLUTION.

A great many platers make mistakes in not dissolving the chemicals used in plating solutions properly and correctly. Any solution, whether it takes one chloride of metal or more than one, that is not mixed together properly will not work as it should. Therefore it must be seen that the substances put in the solution are dissolved in boiling water, and that there is no metal or chemicals falling to the bottom of the jar or tank.

Sometimes the solution is made right, but fails to work up to expectations. At this point examination should be made to see if the proper amount of current is being used, and that the dynamo is in good working order. Caution should also be taken to see that there is no iron pipe crossing any of the connections and causing short circuits.

Formula for making black nickel solution No. 1,

Chloride of nickel	¼ pound.
Carbonate of ammonia	¼ pound.
Cyanide of potassium	1¼ pounds.
Chloride of copper	½ pound.

Three pounds of white arsenic should be used to each fifty gallons of the above solution, and the strongest voltage possible should be used. To mix this proceed as follows: Dissolve the carbonate of ammonia and the cyanide in one gallon of water; add the chloride of nickel and the chloride of copper, then boil the solution or part of the solution with the amount of arsenic which you have put in in order to take it up.

Formula for making black nickel solution No. 2.

Double sulphate of nickel	12 ounces.
Aqua ammonia	1 pint.
Carbonate of ammonia	2 ounces.
White arsenic	2 ounces.
Cyanide of potassium	5 ounces.
Water	1 gallon.

Use nickel anodes. Dissolve the double sulphate of nickel (double nickel salts) in three quarts of the one gallon of water. Add the pint of aqua ammonia; then dissolve in one quart of water the five ounces of white arsenic. If possible take up all the arsenic with the cyanide and if it does not take up readily when cold, use it at a boiling temperature. Then add the two solutions together and use in the regular way. Sometimes a stronger current and sometimes a weaker one is required, according to the amount of work in the solution.

SAFETY FIRST *

AN ARTICLE DEALING WITH THE DANGERS OF INTOXICATION AND IGNORANCE AMONG INDUSTRIAL WORKERS.

BY F. W. REIDENBACH, ROCHESTER, N. Y.

When I was asked to prepare a short paper for this convention on the subject of "How to Avoid Accidents in Small Foundries, or Health and Safety of Employees" and one that would create a discussion, the thought occurred to me that "Safety First" would be a good title, being so well known throughout the entire country. After making a thorough examination of a large number of casualties, the main and most vital causes are summed up under two headings, lack of proper education and the use of intoxicating liquors.

Then we must consider the first portion of this paper: "How to Avoid Accidents." And as order is Heaven's first law, so "a place for everything and everything in its place" seems to me to be the one and greatest factor in the prevention of accidents.

The lack of proper education is perhaps largely the cause of many of the small casualties. To speak along generalities would be to unjustly charge some men (and I hope they are in the minority), with an absence of brains. But after all is said, is not this lack of brains, the very thing that is directly or indirectly the cause of our troubles?

If such a condition could arise whereby any boy or man who does not meet with the ordinary requirements of at least a common school education should be barred from employment in foundries or shops where machinery and furnaces are in operation, in a few years it would revolutionize the whole foundry situation with regard to the safe operation of all plants. A good recommendation to put into force is this one copied from the DuPont Powder Co.'s resolutions for the New Year:

Learn and obey rules and instructions.
Never take chances.
Never take short cuts by the path of danger.
Think before you act.
Be watchful for your safety and that of your fellow employees.
Be neat, cleanly and efficient, not only in personal habits, but in work and care of tools, apparatus or buildings.
Report dangerous conditions or dangerous practices.
Keep your temper when handling tools or men.
Extend a helping hand and a few words of advice to the newcomer, to the foreigner or the man who does not understand.

If this can be carried into effect, an ideal plant will be maintained and all will enjoy happiness and serenity that serves to perpetuate unity of employer and employee, and its good effect upon all conditions, both moral and financial, will accomplish much.

There should be no conflict between the employer and the employee upon the questions that have been before the public for a long time. If viewed in the right light, you will find that the employer and employee are yoke fellows and when a man wishes to rise to the full expectation of his ambitions, he must consider his lot as one of yoke fellow. "I will" has achieved more victories than "I can't."

The sale and consumption of alcoholic liquors is the most vital of all causes of deficiency in our men. Here it will be necessary to use quotations from men of authority and the very first is our own Thos. D. West of Cleveland.

One immediate result of the nation-wide prohibition movement is the recognition being accorded liquor as a chief factor of industrial inefficiency. As a consequence, Thos. D. West, manager of the West Steel Foundry Co., of Cleveland, O., voices the business view of the question in this statement: "This inconsistent outwitting of justice, common sense and humanity (saloon license) supported by laws is responsible for many of the 2,000,000 injuries and 35,000 deaths that occur annually in the United States today attributed to industrial causes." This alone is strong enough evidence to convince anyone of the employers of men that drinking habits are detrimental to good workmanship.

But here is another and more convincing argument: "Under local prohibition there has been a decrease of 54 per cent. in accidents in the big steel mills of Coatesville, Pa., and a decrease of 75 per cent. in applications for aid in just six months' time, according to the testimony of the vice-president, Chas. L. Huston. Furthermore, the decrease in absences from work on Mondays or days following pay days is 80 per cent."

Now the attitude of our large enterprises is being directed against this one great cause of inefficiency. Let me offer just a few more of these vital and direct changes. To quote from a newspaper:

"Kittanning, Pa., Feb. 25.—Employees of the American Steel & Wire Co., here and in Leechburg, Pa., where the company has large plants, were today notified to withdraw at once from fraternal organizations that conduct clubs. Officials in giving the order declared that the sale of liquor in such clubs impaired the efficiency of working forces in the mills."

TO ENCOURAGE TOTAL ABSTINENCE IN STEEL MILLS.

"Pittsburgh, April 1.—A new rule has just been posted by the Carnegie Steel Co., in all its plants in the Pittsburgh district as follows: 'To the employees of the Carnegie Steel Co.: Hereafter all promotions of any character whatever will be made from the ranks of those who do not indulge in intoxicating liquors of any kind and are known to be abstainers or teetotalers in all the meaning that these words imply. Foremen of the various departments are instructed to enforce this rule.' Signed, A. C. Dinkey, President. This order was posted at the instance of E. H. Gary, chairman of the U. S. Steel Corporation, who has issued a statement to the effect that the Corporation is determined to advance only sober men and those interested in the move to drive intoxicating liquors out of the big steel plants, as many accidents are said to have been due to intoxicated workmen. This order will apply to all of the subsidiary companies of the Steel Corporation." The Standard Oil Co. has adopted the same course as the steel companies and many other institutions of production are of the same opinion.

Safety in health calls for a well-lighted and thoroughly ventilated foundry, and especially so when any great amount of yellow brass castings are in course of manufacture. Keep the air as pure as possible. If you have no natural means of ventilation, use a suction fan, the increased amount of work obtained will more than justify the installation and cost of operation. It pays both employer and employee.

Next comes cleanliness. Have a wash room. Quoting from the Scripture, "Cleanliness is next to Godliness." So cleanliness is essential to good work. Soap is the greatest product of the centuries when used. When a man is afraid of a small piece of soap and a little water, you are justified in filling his place with one who is not. This, with an abundant supply of good water is all that

*Presented jointly before the American Institute of Metals and the American Foundrymen's Association, Chicago Convention, September 7-11, 1914.

is required of any foundry to give the employee the foundation of real health. All the rest lies with the employee.

So what is the conclusion? But few things remain charged against our industrial advancement of efficiency, other than the lack of proper education and evil habits. So the following recommendations are submitted for discussion:

First, to bring about the conditions set forth in this paper, all men shall possess at least a common school education to be employed in any ordinary capacity in foundries and only men of higher education to occupy positions of trust and responsibility, always giving a man a chance to rise from the ranks.

Second, under no circumstances whatever shall any man either in a minor position or an executive one be considered who is not an absolutely total abstainer from all kinds of liquors.

THE METAL INDUSTRY IN EGYPT

A Few Interesting Facts Regarding the Native Metal Worker.

By Herbert Garland.

In prehistoric times the Egyptians were amongst the first people to apply copper to their needs, and it is rather strange that the predeliction they then acquired for the metal has lasted through some seven thousand years until the present day. Copper cooking utensils are everywhere in great demand in Egypt, and even the poorest native has his few small pans of this metal in preference to cast iron ones which he could obtain much more cheaply. In a way they act as his bank, for he knows they always have a certain intrinsic value, and when beyond repair he can obtain their price as scrap from the dealer, towards the cost of new ones.

In each town of importance there is a distinct district where the coppersmiths have their workshops. A few of the establishments are fairly large, but most are quite small, employing only two or three men and

FIG. 1. THE EGYPTIAN METAL WORKER AND CASTER.

boys. The methods of manufacture are somewhat crude, and of course the work turned out is generally of a rough nature. The smith squats upon the floor with his anvil stuck in the ground before him. Two typical examples are depicted in Figs. 1 and 2. The articles he makes are chiefly pans and dishes for cooking and water vessels. They are hammered to shape in the cold state in from 8 to 12 stages, according to the nature of the article, and after each stage the metal is subjected to a rough annealing.

The furnace used for annealing is simply a very smoky charcoal fire, no doubt purposely kept smoky to prevent excessive oxidation. This is blown by a cylindrical shaped bellows, and the objects are brought to a dull red heat one at a time, afterwards being thrown on the floor to cool. When finally hammered to shape, they are slightly cleaned, but the hammer marks are not, as a rule, removed. Culinary utensils are afterwards tinned inside and out, but vessels for water are left plain.

A walk through a Cairo side street quickly con-

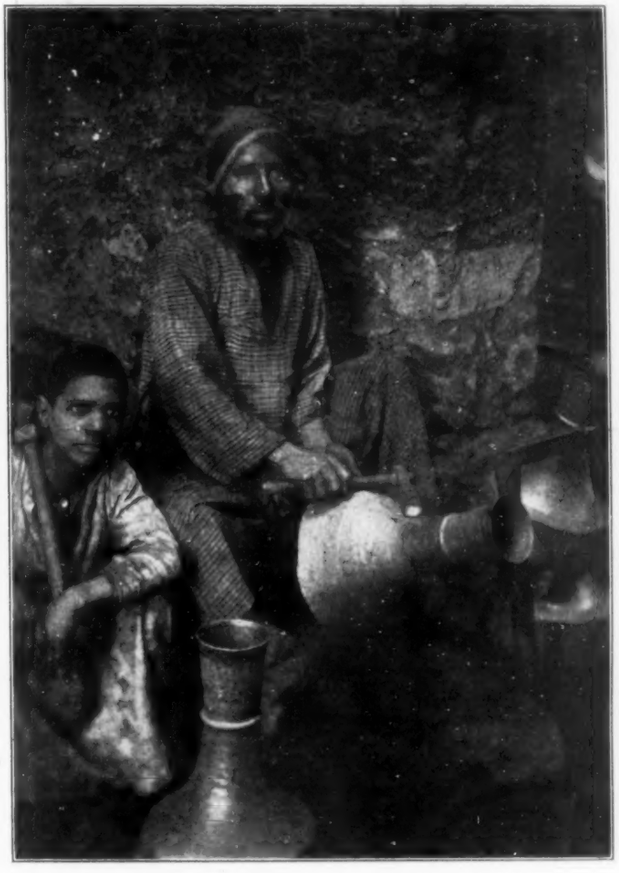


FIG. 2. MAKING COPPER VESSELS.

vinces the traveler of the importance of the metal work industry in Egypt. Besides the shops offering copper pots and pans for sale, there are innumerable little native cookshops, each replete with utensils of this metal, and also many cafes with shelves full of vessels shining with a polish that might make even a metallographist envious. A photograph of a copperwork dealer's shop is given in Fig. 3. An idea of the extent of the non-ferrous metal business in Egypt may

be got from the fact that in 1913, $900,000 worth of copper, brass and bronze goods, including manufactured goods as well as the raw material, were imported, most of which were sent from England.

The workshops of the native casters and brass,

FIG. 3. METAL DEALER'S SHOP.

bronze, etc., are also found in a street almost by themselves. For the most part they are merely small shops with open fronts, and a crudely made furnace at the back of each. The caster sits at the entrance making his moulds and pouring his metal in full view of the passer-by. There is no deception about his foundry practices. Small articles up to about 10 pounds weight, including spoons, parts of harness and saddlery, and little articles of an ornamental nature, are made in these places. No time is wasted in weighing out the correct proportions of the constituents of the alloys, but the workman, more or less experienced, puts in the metal, generally scrap, by the handful, and he makes no effort to minimize oxidation by the use of charcoal or a crucible lid. He carries on his work in the very sulphurous atmosphere produced by the small boy who presides at the bellows. A shop of this kind is shown in Fig. 1, but owing to the narrowness of the thoroughfare in which the building was situated and to the absence of illumination or effective ventilation inside the shop itself, the author's word must be taken that the furnace and other essential parts of the equipment not visible in the photograph are situated amidst the inky blackness reigning over the back of the shop.

The tinning of vessels is a separate industry. The itinerant tinker with his boy makes house to house visits re-tinning articles that require it. His methods are picturesque though practical. For a fire on which to heat the pans he makes a hole in the ground and connects a bellows made from a goat skin. The boy cleans the articles, his usual method for the inner surfaces being as follows: After throwing in a little wet sand, he stands inside the pan or dish with bare feet, and, holding to an adjacent wall, twists his whole body round and round. Judging by the number of tinned vessels one sees in daily use, there must be a considerable trade in tin and fine solder in Egypt. It is not an uncommon sight to see a native assiduously smelting the solder from empty condensed milk tins, nor is it unusual to read in the local paper that some individual with an unfortunate taste for metallurgy has been convicted of stealing the brass screw-caps from the street hydrants.

The foregoing gives an idea of some of the native methods. There are a number of more important foundries and workshops dealing with brass and bronze in Cairo and Alexandria, as well as several owned by government departments, whilst there are at least two privately owned factories turning out lead-piping for water and gas.

THE USE OF CHEMICALS IN THE HARDENING OF METALS

By A. P. Wright.

The best known agency for the hardening of metals is antimony. The tradition is that the name was given to the sulphide on account of a preparation of it having proven fatal to the monks. (Hence anti-monarchs.) Antimony presents a characteristic stellate surface; it is brittle and may be easily pulverized, it alloys readily with all metals. I have no substitute to offer in its place. What I have to say will be in my humble way as a metalist. I have been experimenting with various substances trying to solve some method whereby I could harden metal without the use of antimony. While I have succeeded in a certain degree to change the fracture of malleable metals, there is nothing permanent in my discoveries.

The continued remelting brings back the metal to its original structure. Lead and tin may be hardened (either together or separately) by the use of sulphur, introduced through a tube, at a red heat; the charge being covered with a layer of slag to keep out the air.

Phosphorus in the form of powder as made by Albright and Wilson has proven a good agency for changing the structure of lead, copper and tin and is used quite extensively in the manufacture of bearing metals, bronze, etc. Yellow phosphorus can be used but is more difficult to handle, and requires more careful attention.

The use of sodium has proved a very interesting experiment and one worth trying, as I believe there is a future in the use of it in the manufacturing of babbitt metal. Sodium has quite an affinity for lead which can be hardened so as to be as brittle as a piece of zinc. Sodium oxidizes very readily; if exposed to the air, must be put under the metal as quickly as possible, the metal being heated to its highest temperature.

And now, my brother readers, you who have worked from the bottom up and reached the top of your various arts, who like to experiment for the sake of knowledge, try mixing some of your alloy with mercury. It is quite interesting to know what a small addition of mercury will do to improve your metals. Be sure and heat your mercury before fusing with the hot metal. Another interesting experiment is the introduction of gas into molten metal, especially those of high melting temperatures, and I believe there is some possibility of developing some new metals through this agency. If this article has provoked any doubt, I am sure the columns of this paper will be open to all who wish to express their views, whereby the metal trade may be benefited.

THE CARE AND CONVERSION OF ROLLING MILL SCRAP*

A Lucid Explanation of a Puzzling Problem.

By W. W. Rogers.†

The problem of the care, conservation and conversion of scrap is one of the most important factors in the successful running of a modern rolling mill. The number of alloys now on the market is legion, and to the making of new ones there is no end. Many are so alike in composition (though masquerading under different names) that the services of an expert chemist are necessary to differentiate between them. Numbers of these alloys are sold on a strict percentage basis, to be guaranteed on analysis, notwithstanding the fact that the particular alloy may be rarely, if ever, called for again.

A clause in the specifications usually requests the price to be paid for the scrap that results during the manufacture of the material into the specific articles for which it was purchased, and in many cases, this exceeds 50 per cent. of the material supplied. The question arises: What is to be done with this class of scrap. Apart from alloys that are but rarely called for, there is a class of alloys composed of exactly similar metals that vary immensely in percentage composition, of which a large proportion is returned to the rolling mill as scrap. And again it becomes necessary to inquire: What is to be done with this class of scrap?

And now let me remark on the condition in which the scrap is frequently returned from the manufacturer to whom the material is supplied: Oftentimes it comes back mixed with oily waste, iron filings and turnings and a heterogeneous collection of other alloys and materials, and then, at once, there ensues a clash between the mill and the purchaser as to the value of the scrap returned; yet, if the returned scrap was incorporated into the next batch of material of similar composition to the lot from which the scrap was a part, it would be at once rejected, both on analysis and physical properties. A little care and forethought on the part of the manufacturer would avoid much unpleasantness, lead to a better feeling and greatly enhance the value of the scrap returned.

But, to return to the question of what is to be done with the scrap: On receipt, the parcel should be carefully sorted over and classified into "good" and "bad," full value being given for the good and the bad appraised at its worth. The bad should be set aside in receptacles plainly marked as regards its composition; and if at all usable for non-guaranteed castings or other material, held for that purpose only, and if not suitable for any purpose in the mill, sold to a refiner who purchases that class of material. The good, together with similar working scrap, should be at once cabbaged up and stored in plainly labeled bins, until there is a demand for its use.

As regards the accumulation of both working and purchased scrap, it is plainly evident that a point is speedily reached when a large amount of working capital is rendered unproductive, and no mill can afford to pile up its scrap bins indiscriminately; so a system must be introduced by which the metals contained in them may be marketed as quickly as possible. As an illustration of what I mean, there can be no better example than the so-called German Silvers. They consist of an infinity of varying amounts of nickel, copper and zinc, and are usually classified on the percentage of nickel they contain. Those commonly on the market are:

5%, 8%, 10%, 12%, 15%, 16%, 18%, 21%, 25%, 30%, and, while the percentage of nickel is fixed, nearly every mill has its own formulae for the percentages of copper and zinc that constitute the remainder of the alloys. Now, as few or many of these may be in daily course of manufacture, it is easily to be seen that the scrap of some will greatly exceed that of others, and as the call for material of which the mill has an excess of scrap may cease, it becomes necessary to convert this excess into any particular German Silver that may be called for.

The following simple calculation easily solves the problem:

I will assume that there is an excess of 10 per cent. German silver which it is desired to convert into 18 per cent. Proceed as follows:

Place the scrap it is desired to convert on the left, the alloy required on the right, thus:

Composition of 10% scrap.		Composition of 18% German Silver required.	
Copper	60%	Copper	62%
Nickel	10%	Nickel	18%
Zinc	30%	Zinc	20%
	100%		100%

Next, select in the left column, the constituent that has the greatest excess over any similar one on the right. In this case, it is manifestly the zinc, viz.: 30 per cent. in one case and 20 per cent. in the other. Now multiply the 20 per cent. by 100 and divide by 30:

$$\frac{20 \times 100}{30} = 66.66.$$

This figure is the amount of scrap to be used in 100 pounds of the required alloy, and this quantity contains the necessary amount of zinc.

In order to discover the requisite amount of copper to be added, calculate the amount of copper in 66.66 pounds of the 10 per cent. scrap thus:

$$\frac{66.66 \times 60}{100} = 39.996.$$

This is practically 40 pounds. Subtract this from the percentage of copper in the 18 per cent. German silver required in the right column:

$$62 - 40 = 22$$

and you have the amount of copper required.

Proceed in the same manner for the nickel:

$$\frac{66.66 \times 10}{100} = 6.666.$$

Subtract this from the percentage of nickel in the 18 per cent. German silver required:

$$18 - 6.666 = 11.334,$$

and you have the amount of nickel necessary to complete the required alloy.

Now add up what is found:

66.666 lbs. 10% scrap, which contains the necessary zinc.
22.00 " copper
11.334 " nickel
100.000 "

*Paper read at annual convention of American Institute of Metals, Chicago, Ill., September 5-12, 1914.

†Riverside Metal Company, Riverside, N. J.

The quantity of new metals added to complete the charge is now (within certain well-known limits) at the option of the metallurgist.

In conclusion, I would suggest that the scrap of known percentage stored in the bins should not be looked on as so much alloy, but as so many pounds of raw material available for immediate use. If, for instance, a bin contains 10,000 pounds of 10 per cent. German silver scrap, forget it as a combination of metals, but assume it to be 6,000 pounds of copper, 1,000 pounds of nickel and 3,000 pounds of zinc. By bearing this in mind, the conversion of any known percentage of scrap into any required alloy of similar metals will be rendered easy, certain and accurate.

THE PRODUCTION OF MATT AND SATIN SURFACES ON METALS

AN ARTICLE DESCRIBING THE USE OF ACID DIPS AND THE SAND BLAST FOR PRODUCING THESE FINISHES.

BY EMMANUEL BLASSETT, JR.

INTRODUCTION.

There seems to be no record of the origin of matt dipping in the text books on metal finishing and electroplating. The early writers on plating and metal coloring all have reference to bright acid dipping, but no mention is made of matt dipping, and it is assumed that this process was not employed until later, when a demand for fancy finishes was created. Matt dipping is also known as Ormolu dipping, the word ormolu being derived from the French, and meaning "ground gold." It was originally an imitation of low karat gold, and obtained by the use of matt dips containing saltpetre. The ormolu finish on brass is now generally obtained by matting in the usual matt dip, bright dipping if desired, and giving the article a thin coat of gold and finally lacquering. A matt finish is not readily produced on copper or on alloys in which copper largely predominates, by the acid dip, and it is best to use the sand blast on such alloys. The matt dip produces the most effective results on ordinary yellow brass and German silver, if the latter is not too rich in nickel. Alloys that have a large percentage of zinc are the best adapted for matt dipping, and red brasses do not respond so well. It is not particularly clear why the sulphate of zinc should produce a matt surface. The most plausible theory is that on account of the solution being saturated with zinc, the acids do not dissolve any more zinc from the metal, but dissolve only the copper, and thereby producing an uneven or matted surface. This theory seems sound, as it is proven in practice that only alloys containing a fair proportion of zinc can be treated.

While matt finishing by the acid process is still extensively employed, the tendency today is to use the sand blast for this purpose whenever it is possible. The sand blast is always to be preferred as the finish is more uniform, and there are no poisonous fumes present as in the acid process. It is generally more economical to use the sand blast, especially on large pieces. The blast is aso to be preferred for treating copper and alloys low in zinc, which are not readily matted by the acid dip. For small articles such as buttons, buckles and novelty work in general it is more economical to use the acid dip. These articles are handled in a basket on a wire, a large quantity being treated at one time.

MATT DIPPING BY THE ACID PROCESS.

To produce a matt surface on brass goods, the first step is to polish out any imperfections that the metal may contain. All streaks or pits in the metal should be removed, or they are apt to show badly on the finished article. The standard matt dip that is most widely used is composed of equal parts of nitric and sulphuric acids, saturated with zinc sulphate. Always pour the sulphuric acid into the nitric acid, never the reverse. The jar containing the acid should be placed in hot water. The usual arrangement is to have a steam coil placed in a wooden tank filled with water, which is kept nearly to the boiling point while operating the dip. The jar containing the acids may be placed on several bricks, resting on the bottom of the tank. A tank containing running cold water should be at hand for rinsing. As the hot dip fumes vary vigorously while working, a suitable blower is necessary to carry off the gases. No water should be added to the dip. Before immersing the work into the dip it should as far as possible be freed from grease in the usual manner. If the surface is too greasy the acid will not act evenly, and the matt will not be uniform. Before dipping the work it is best to stir the acids with a stout glass rod or wooden ladle to bring the zinc in solution.

Either a coarse or fine grained matt may be produced, when the necessary skill is acquired in manipulating the dip. If the matt is too coarse, nitric acid should be added slowly until the desired degree of fineness is produced. If the matting should be too fine sulphuric acid is added. When the matted surface is too bright zinc sulphate will give a duller effect. If the condition is reversed nitric acid will brighten the surface. Occasionally brass goods are nickel plated directly after matting, without brightening in the bright dip. This produces a French gray finish, sometimes called Russian gray, and either a bright or dull finish may be produced from the matt dip. When work is immersed in the hot matt dip a boiling action is noticeable, with the evolution of considerable gas. If the boiling should be too vigorous, sulphuric acid is added. If the action should be too slow, nitric acid is introduced. Upon removing the work from the matt dip it should be rinsed in water and then immersed in the ordinary bright dip, composed as follows:

Nitric acid.....1 part.
Sulphuric acid.....1 part.
Hydrochloric acid.....½ cup for each five gallons.

After bright dipping the work is thoroughly rinsed in running water, and plated, or dried and lacquered as desired.

Some platers use a matt dip composed as follows:

Nitric acid .....2½ gals.
Sulphuric acid .....2½ gals.
Hydrochloric acid .....5 ozs.

This mixture is saturated with zinc sulphate 5 parts and saltpetre (potassium nitrate), 1 part. This dip is kept hot in the manner previously described.

Platers sometime produce the zinc sulphate in the solution in the precipitated form. To accomplish this take 1 gallon of nitric acid and dissolve slowly metallic zinc until the acid is saturated and will not dissolve any more metal. The jar containing the acid in this operation should be placed in cold water, so as not to evaporate the acid by the heat that is generated in the reaction. The zinc should be added slowly, so that the acid

will not boil over. When the acid will not dissolve any more zinc, add sufficient fresh acid to make up to the original gallon. Now add one gallon of sulphuric acid. This will cause the solution to turn to a milky color, which soon grows to the consistency of cream. This is due to the sulphuric acid precipitating out the zinc sulphate. By this method a very finely divided precipitate of zinc sulphate is produced, which gives a fine uniform matt. Some platers claim to produce better results by this method. Adding the zinc sulphate directly to the acids should give equally as good results, with less labor to the plater.

Another formula for a hot dip is as follows:

Sulphuric acid	2½ gals.
Nitric acid	2½ gals.
Zinc carbonate	5 lbs.
Saltpetre	1 lb.
Hydrochloric acid	5 ozs.

All the dips previously given are used as hot as possible by placing the jar holding the acids in hot water. Where large quantities of work are handled it is more economical to use the hot dip, as the matting is done more quickly. Where only a small amount of work is matted during the day it is preferable to use a dip not too hot to obviate the disagreeable gases that are evolved. A dip used slightly warm is as follows:

Nitric acid	1 pint.
Sulphuric acid	1 gal.
Zinc sulphate	2½ lbs.

The work may be left in this dip for one-half hour, or until it is sufficiently matted. The jar containing the acids should be kept in warm water. This dip should not fume if the water is kept at about 120 degs. F.

An entirely cold matt dip is made up as follows:

Sulphuric acid	6 quarts.
Nitric acid	1 pint.

Saturate the acid with zinc sulphate. This dip is very desirable on long pieces of work, such as tubing for chandeliers. It would be undesirable to run a hot dip of sufficient capacity to matt long pieces of tubing. The work is left in this dip for two hours, or until the desired matt is produced. The dip should be stirred with each batch of work. It produces a fine, uniform matt, and no disagreeable gases are evolved. When the matt is not coarse enough a little nitric acid, not more than a pint at one time, should be added.

MATTING ALUMINUM.

Aluminum, unlike most common metals, is attacked strongly by solutions of caustic alkalies. Alkalies also act on zinc, but not to such a marked degree. When aluminum is immersed in a strong solution of caustic potash or caustic soda, hydrogen gas is evolved and the aluminum is dissolved, forming aluminate of potassium or sodium. This chemical reaction leaves the aluminum with a matt or satin surface, which makes a suitable finish for a large variety of aluminum goods. To matt aluminum first immerse in the following solution:

Water	1 gal.
Caustic potash or caustic soda	1 lb.

This solution should be used hot. Upon dipping the aluminum article, gas will immediately arise from the surface. This should be allowed to go on for about a minute, or until the gas rises freely and uniformly, when the work is rinsed in cold water. The article will then be usually covered with a dark film, which is removed in a dilute solution of nitric acid. This dark film are the impurities that are found in commercial aluminum, which the potash solution does not dissolve off. Before dipping, the aluminum should be polished if necessary to remove any imperfections in the metal. When the articles are removed from the potash solution a finer matt or frosted effect may be produced by brushing the articles on a soft wire scratch brush, about 6 inches in diameter, and revolving at about 2,200 revolutions per minute. Brushing gives very uniform results, and is superior to work that is simply matted in the potash solution.

PRODUCING A CRYSTALLIZED SURFACE.

Crystallized surfaces on brass and bronze castings are produced by dipping in a solution of bichromate of potassium, acidified with hydrochloric acid. Sheet brass or bronze cannot be treated effectively in this solution. The rolling which the metal receives hardens it to such an extent that its crystalline nature is partially destroyed. The solution for producing a crystallized surface is as follows:

Water	4 gal.
Hydrochloric acid	4 qts.
Bichromate of potassium	2 lbs.

This solution does not generate any disagreeable gases. It is preferable to keep it luke-warm by placing the jar containing the solution in warm water. It may be run cold if desired, but a longer time is required to produce the crystals. The solution should not be used hot, but simply luke-warm. If heated too strongly chlorine gas is set free, which retards the action of the solution, and will prove very disagreeable to the operator. The work should be well rinsed in water when removed from the solution, and put through a strong cyanide dip to remove any discolorations. It is then plated or colored, or dried and lacquered as desired.

The following formula is claimed by some platers to produce superior results:

Water	2½ gals.
Hydrochloric acid	2½ gals.
Copper sulphate	3 lbs.

This solution should be kept at about 130 degs. F. The crystals readily form, and on removing the article it should be rinsed in water and run through a cyanide dip.

For producing a crystallized surface castings high in aluminum and tin give the best results. Ordinary yellow brass responds to the treatment very well, but castings high in zinc give indifferent results, as the zinc is dissolved out by the hydrochloric acid, and only a copper finish is apt to be produced.

What is technically known as a frosted surface is produced by first heavily matting the article in the ordinary matt dip, and then brushing with a swing brush made of steel wire, and finally running through the ordinary bright dip. The sand blast may be used if desired, instead of the matt dip.

SATIN FINISHING.

The ordinary matt dip can be made to produce a satin finish by using smaller quantities of nitric acid and sulphate of zinc. Some platers confuse the terms "matt" and "satin" finish, and regard both as being identical. As its name indicates a satin finish is a smoother and much finer grained surface. Some platers make up a satin dip as follows:

Nitric acid	1 part.
Water	2 parts.

Another satin finish dip is composed of:

Sulphuric acid	2 parts.
Nitric acid	1 part.
Water	5 parts.

When the work is removed from the satin finish dip it should be given a quick immersion in the bright dip to bring out a lustre. Before immersing the work in the satin dip it should be polished if required, and be perfectly free from grease. While these dips give good results in experienced hands, most satin finishing is accomplished on steel wire brushes of various grades of wire and design. What are known as swing brushes are generally used, revolving 2,000 revolutions per minute or more. Brass goods that are to receive a satin finish should first be polished and all imperfections in the metal removed. Some workmen use an ordinary circular brush revolving at a high speed. Satin finishing silver-plated ware or "pearling," as it is sometimes called, is effected on a circular brass wire wheel revolving at a high speed.

THE USE OF THE SAND BLAST IN PRODUCING MATTED SURFACES.

The constant demand for artistic finishes on metal goods has given the sand blast a very wide field for usefulness. Its application for this purpose in recent years has developed an industry that was undreamed of when the sand blast first came into use. The sand blast is employed for surfacing other materials than metal, and its application to the metal industries is only referred to in this article. It is widely used for cleaning metal castings in preference to pickling. It should be preferred for matt finishing instead of using the matt dip when it is practical to employ it.

In using the sand blast any degree of matt may be produced, either deep, light, close or coarse grained. The various finishes are produced by varying the pressure and the use of abrasive materials of various cutting qualities. For a fine matt used on jewelry work powdered pumice is employed. The fineness and evenness of the matt is a matter of regulating the pressure, and the use of the right cutting material. Instead of pumice fine emery is sometimes employed. For a fine satin surface a low pressure of about 3 pounds per square inch is required. A low pressure is essential when blasting work after it is plated. It is obvious that a high pressure is apt to remove or mar the plate.

For a finish to match the ordinary matt produced in the matt dip a sand of medium grade is required. Crystallized surfaces are produced by high pressure and the use of very coarse sand or ground glass. A pressure of 16 pounds per square inch or more is required. Where a partial sand blast of the surface is desired the parts to be left without matt are covered with a thick cloth or paper by the use of glue. The design or pattern is carefully cut out in the cloth or paper, and glued firmly to the article, so as to obtain sharp lines. After the article is blasted the glue may be removed by hot water. In this manner effects impossible to produce in the matt dip are obtained. After sand blasting all ordinary work that requires a subsequent finish should be run through the ordinary bright dip to give it the desired lustre. By judicious manipulation and the careful selection of suitable blasting material, with the use of a uniform low pressure, a large variety of delicate and artistic finishes may be produced. The beauty of these finishes is enhanced by various methods of oxidizing, coloring or plating, and relieving the surface according to the design.

SETTING THE PACE IN A BRASS MANUFACTURING PLANT

An Example of the Value of Personal Application.

By P. W. Blair.*

In this modern age of system and cost if more consideration had been given to pace-making instead of the expense that the different brass manufacturing concerns throughout the country have gone to in the past few years to increase the production and reduce the cost of manufacture, better results would have been obtained.

As an illustration I will give some observations from practical experience. Let the shafting rattle and the equipment in general get out of order, it will then be noticed that most of the hand labor is done to the same tune. By belting the line shafting off a high speed motor and lining the shaft up and then putting it in first class condition it will be found that the men will work in unison. Watch for the men that are the pacemakers in the different departments and if there are none, develop them. It is also well to watch the machines that run too fast or too slow so that a maximum output is obtained. Lax methods of handling stock and castings will demoralize a whole department. If one workman fools away his time with crude equipment it will soon be found that every man in that department has fallen back a step.

A young man learned the brass finishing trade and ended his apprenticeship at the age of nineteen. He was a quick thinker and his hands moved fast and nervously. At nineteen he was drawing more pay working on a piecerate basis than men far older than himself. This fact caused much resentment among his co-workers which finally led to his leaving the shop. He drifted around the country working at various operations for four years, finally landing at another brass plant. There was no real vacancy but the manager of the plant told him that he had some odd jobs which might justify his paying him a small wage. He accepted the opportunity because work at that time was scarce and he felt that he could work up.

One of his duties was to keep the men supplied with material and castings. Between times he was to sharpen tools and work at any machine that happened to be idle. His old knowledge of brass goods came back to him and he worked hard to win promotion. He was getting it, too, for each month for four consecutive months his pay was being raised three cents per hour; then some time elapsed and he was given another raise. This went on for two months and he then received an offer of a position with an outside concern with whom he had been in touch before coming to this brass plant. So he went to the foreman to resign.

"Resigning?" said the foreman in a dazed way. "Wait awhile until I tell you a few things. You are slated to be my assistant foreman next week, and you have tuned up the whole plant with your alert ways of working, and this firm cannot afford to let you go. You are also the only man that has been hired in this department for the past six months, yet during that time our production has increased twenty-five per cent."

This is an illustration to show where one person in a department can increase the production to a large extent and yet occupy a minor position. Many foremen pick out the least useful employes in the shop to move stock and castings, as they do not realize how many waste motions can be saved by putting the castings in a convenient position for the operators. Does your truckman follow the work or set the pace? An alert truckman around the foundry, finishing, polishing or plating departments is important, as he is one of the leading pacemakers.

*Superintendent Brass Finishing Department, H. Mueller Manufacturing Company, Sarnia, Ont., Canada.

THE INFLUENCE OF STYLE ON THE ART METAL WORK OF MODERN TIMES

A Continuation of a Series of Articles on This Interesting Subject.

By A. F. Saunders,*

THE RENAISSANCE, ENGLISH AND GERMAN.

The Gothic as a style was so well established in England, it had grown to be so much a part of the people, that it naturally took a very long time for a new style to gain much favor or make any progress in a country so conservative in its very nature as England has ever been. It was a long and gradual transition from the Tudor or late Gothic to the high Renaissance of the time of Inigo Jones and Sir Christopher Wren, England's most famous architects in the 17th century.

A real characteristic English Renaissance did not begin to develop itself until well into the reign of Queen Elizabeth, 1558-1603, when it was known as the Elizabethan style. This gradual transition from the Gothic corresponds with the same movement that developed a new style under Francois I., in France, and it was not until the return of Inigo Jones from his extensive studies in Italy that it really freed itself entirely from Gothic features. This was due principally to the establishment of a pure classical school of art in England, founded on the spirit of the celebrated Palladio; it was then that a complete change in the architecture of the country began.

On the other hand Sir Christopher Wren completed his studies in France with the result of his work all showing a strong French feeling. In the combination of these two distinct influences a style developed that very closely approached the French Barocco, under the name of Later Renaissance, yet it was a style very English in character. The transition period under Elizabeth was not based on the sympathy of classical form as was the beginning of the Ranaissance in Italy, but was a style development for show, a style designed to display to the world the great wealth and culture of England at that time. Yet one cannot say that the Elizabethan style lacked character or beauty; its main fault was its tendency toward over-elaboration; it borrowed material from every available source, transforming it into vivid and spirited decorative art as definitely English as the Louis XIV. was French. In many respects the Elizabethan style was the most interesting of any of the English period styles.

Following this strong tendency toward elaborate and showy detail so characteristic of the early English Renaissance under Elizabeth, in marked contrast do we find it under James I., 1603-1625. It then became the very acme of solid dignity and refinement under the title of Jacobean, a period plainly identified by its positive curves and angles and a certain imposing air of warm state lines and solidity most characteristic of the reign of this staunch monarch. With the political unrest of the country under Charles I. (1625), civil wars raging, it was but natural that the art of the country came to a standstill, and it was not until Charles II. had been placed on the throne that it again showed signs of a further development. At this time Dutch influence asserted itself, and the style lost much of its truly English character and feeling such as we find in the Jacobean period.

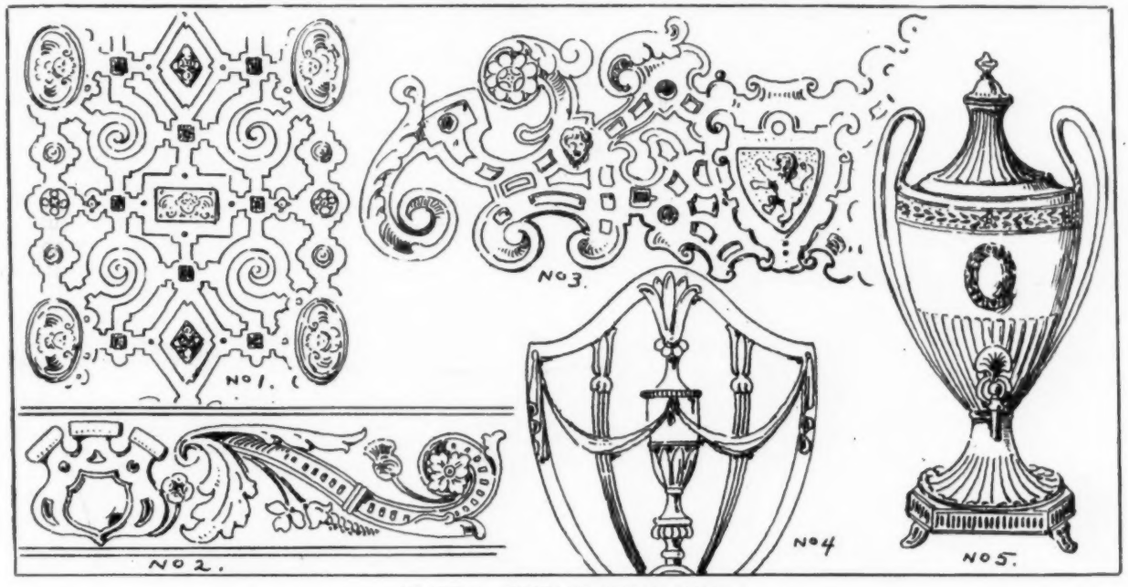


PLATE 1. ENGLISH RENAISSANCE.

No. 1. Elizabethan Period. Fragment of wall decoration, 1600.
No. 2. Elizabethan Period. Part of freize, 1560.
No. 3. Jacobean Period. Fragment of wood carving, 1625. Inigo Jones.
No. 4. Heppelwhite Chair Back. 18th Century. Georgian Period.
No. 5. Silver Tea Urn. Robert Adam. 18th Century. Georgian Period.

Under James II. (1685) far Eastern ideas of decoration borrowed from the Orient were introduced and Chinese figures and ornaments formed the basis of many designs, particularly so in the silver and gold work of the time. This feature was carried more or less into the decorative art during the reign of William and Mary (1689-1702) and continued up until the beginning of the 18th century. During the short period under Queen Anne (1072-1714) there was a tendency toward the classical simplicity of the Greeks. Fluting of all kinds formed the decorative basis of ornamentation. Generally speaking, this tendency of the Queen Anne period toward simplicity of both form and decoration paved the way toward the Colonial style of our English ancestors in America.

Under George I., II. and III. (1714-1820) developed

*Designer, Benedict Manufacturing Company, East Syracuse, N. Y.

the so-called Georgian style. So many various influences were at work during this period that one might almost say a number of individual styles existed in England, under the name Georgian. This was due to the great amount of individuality of such artist craftsmen as Chippendale, the Adam Bros., Sheraton, Hepplewhite and others of more or less note. The influence of these men had a very strong effect upon the art of the whole country. Their individual styles, if we may call them such, owed nothing to any one but the authors themselves. While they borrowed much, and their work in spirit was decidedly French, their efforts were so tempered with the charm of individuality as to give their designs the stamp of wholesome originality.

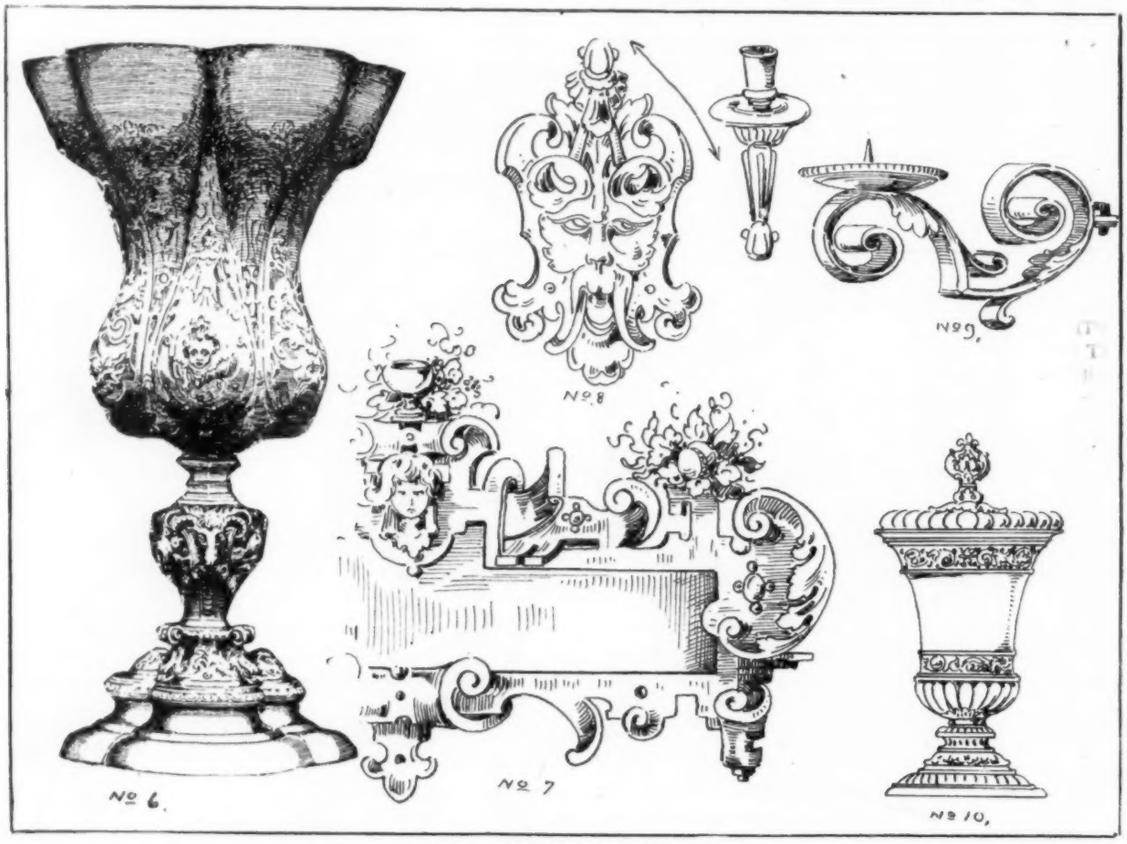


PLATE 2. GERMAN RENAISSANCE.

No. 6. Nuremburg Cup, by Jamnitzer.
No. 7. Fragment of Cartouche. 16th Century.
No. 8. Bronze Wall Sconce. Augsburg. 16th Century.
No. 9. Bronze Wall Bracket, Munich.
No. 10. Silver Cup, 17th Century, Augsburg.

During the Georgian period Paul Lamerie became a big factor in English silversmithing. His productions were many and varied, sometimes comparatively simple in design; others very much overdone in both form and decoration. To some extent his work shows a strong French feeling, especially of the Louis XIV period. Chapters could be written on the characteristics and development of any one of these individual styles, if space allowed, but I can only refer the student reader to the several illustrations herewith shown of the various periods and individual styles which form the English Renaissance.

GERMAN RENAISSANCE.

In Germany the foundation for the Renaissance was far less favorable than in France. As in England, Germany was so bound to the Gothic that it for a long time actually resisted any introduction of a new style whatsoever. To the works of Hans Burkman and Holbein, two engravers, more than any other cause did the Renaissance become countenanced at all, and it was only when at intimate connection was finally established between German and Italian artists, when Italian artists came into Germany and their works on architecture had been known and read, that the new style attracted any serious attention at all. Slow, though, as Germany may have been in embracing this new re-birth in art, once thoroughly awakened to its meaning she proved no mean laggard in treading the path marked out by the Italian revivalists, and the work of her gold and silversmiths during the 16th and 17th centuries is surpassed by none. It could scarcely be said that she followed any other country, as there developed a style most thoroughly German in every particular. Great rivalry sprung up between the different art centers, Nüremberg and Augsburg easily taking the lead in metal work. Illustration No. 6, Plate 2, of the Nüremberg cup gives us a fine idea of the splendid art work in metal of the German Renaissance period, at its best between the years 1525 to 1620.

Consequent upon the thirty-year war, Germany gradually lost her commanding position in the development of art, and from then on she became more and more dependent upon French influence. Since the beginning of the present century German art has begun another Renaissance in art, and through her splendid system of industrial art schools is steadily forging ahead with the prospects of again attaining at no far distant time her once unrivaled position and prestige in the world of art. The next article of this series will take up the Colonial style of our own country and a general idea of the new art movement and its influence upon modern art.

EDITORIAL

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THE METAL INDUSTRY, 99 JOHN STREET, NEW YORK
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CONTENTS

	Page.
The Chicago Convention	367
The Effects of Repeated Remelting on Copper	374
The Influence of Varying Current Densities on the Adhesion of Silver Deposits to High Nickel German Silver	377
Pickling Gray Iron Castings	378
Bull Run Talc	379
How to Prepare an Antique Green Gold Immersion Solution	381
Safety First	382
The Metal Industry in Egypt	383
The Use of Chemicals in the Hardening of Metals	384
The Care and Conversion of Rolling Mill Scrap	385
The Production of Matt and Satin Surfaces on Metals	386
Setting the Pace in a Brass Manufacturing Plant	388
The Influence of Style on the Art Metal Work of Modern Times	389
Editorials:	
The Chicago Convention	391
War and Metals	392
Correspondence:	
Blind Advertising	392
Hydrogen Pitting on Nickel Plate	393
New Books:	
Art Metalwork—With Inexpensive Equipment	393
The Metallurgy of the Non-Ferrous Metals	393
Shop Problems	394
Patents	396
Equipment:	
Patternmaker's Disc Grinder and Roll Sander	398
Blystone Sand Mixer	398
Auto Sand Cutting Machine	399
Office Comptometer	399
No. 5 Universal Turret Screw Machine	399
Gas for Lead Burning	400
Nonpareil Insulating Brick	400
Mellen Casting Machine	400
Exhaust System	401
Eureka Portable Spraying Outfit	401
New Polishing and Buffing Lathe	401
Compensating Turret Chuck	401
Associations and Societies	402
Personals	402
Trade News	403
Metal Market Review	410
Metal Prices	411

THE CHICAGO CONVENTION

The material difference in the foundrymen's convention held in Chicago, Ill., September 7 to 11 inclusive, from those preceding it was one of quality. We have never attended a convention where so much interest and enthusiasm in the proceedings was manifested as at the meeting just closed. The officers of the various associations are to be greatly congratulated upon the satisfactory way the programs were carried out and also for the excellence and length of them. The American Institute of Metals in particular should feel proud of the results of her 1914 meeting. Over 30 papers of both scientific and practical character were read and discussed at the sessions. One important feature of the meeting was the carrying out of a suggestion made last year, that of devoting each session of the institute to some definite phase of metal founding. It will be seen by consulting the opening pages of this issue of THE METAL INDUSTRY how well this was carried out as for instance: Wednesday's afternoon session; Rolling Mills and Physical and Chemical Testing. Friday, both sessions, Melting Practice.

The papers themselves are well worthy of careful study, some of them tabulate the result of long and patient research work, some of them recount the experiences of an experimenter for a shorter way out, some of them give in plain and understandable language information relating to the metals in every day use, and some of them tell in simple manner how some perplexing problem was finally satisfactorily solved. The volume of the institute for 1914 containing all these papers with their discussions, will be a most valuable addition to metal lore. The complete list of the papers presented is included in our report of the convention and is published in this issue of THE METAL INDUSTRY and a better collection of papers on varied subjects has never been presented before the institute up to the present time. We heartily congratulate Dr. H. W. Gillett, chairman, and his committee on papers for the production of these papers which will be an enduring testimonial of their untiring efforts.

The attendance at the meetings, while not quite up to the standard in point of numbers for each meeting, was noticeable for the character of the men composing it. The officers of the institute should feel greatly gratified to note that the scope of the membership is continually spreading and is extending into what has hitherto been most conservative territory. We refer to the Naugatuck Valley in Connecticut, and it is with pleasure we record the fact that the great brass producing section was represented by no fewer than four most able delegates!

THE EXHIBITION.

The exhibition of foundry machinery and appliances which was held at the Stock Yards Auditorium at the same time as the convention is also reported to be a financial success. While less floor space was used than at the exhibition of 1913, held in the same place, the exhibits were wider in variety of equipment and foundry accessories and a more complete display of machine tools was provided. The majority of exhibitors when interviewed expressed themselves as well satisfied with the amount of business done and stated that although the attendance was not as great as last year it had a higher purchasing power and a large volume of trade had resulted. It is too early to comment about 1915, but a rumor is heard of a postponement of an exhibition until the spring of 1916.

WAR AND METALS

At the time of going to press, the war in Europe, the greatest of all wars, is rapidly verging to a crisis. The effect of this war on the world is already tremendous, and no one can attempt to predict what the outcome will be. Our correspondents in the various metal trade centers of the United States all agree that there is a deplorable stagnation in business, particularly in those lines which devote a large part of their product to export trade. There is, of course, a hopeful outlook, and the only way to face the conditions is to keep hammering away to get trade that was formerly supplied from abroad and at the same time be keen to take advantage of opportunities offered for South American business and also be ready when ships are provided for European shipments.

The metal market, of course, has been completely upset, but is now beginning to get back to normal conditions, excepting in connection with the metals that are supplied from abroad, such as tin, antimony, bismuth, etc. Tin, perhaps, is the metal that offers the greatest opportunity just now for American capital to reap a rich harvest. The price of tin today is 34 cents per pound; ten days ago it was 65 cents. The drop to its present price was due primarily to shipments that were received. At present writing we look for a further rise in tin to around 40 cents per pound.

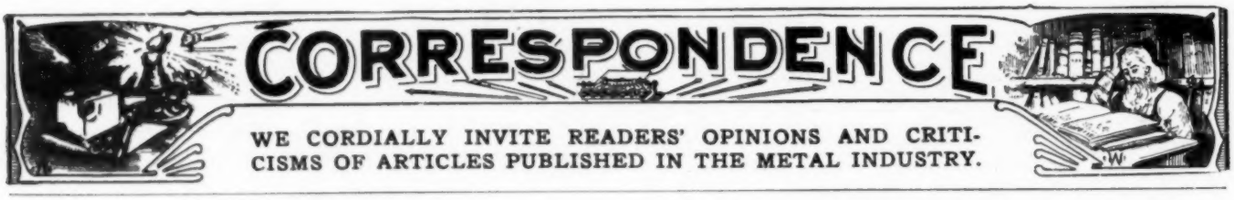
The benefit which it seems possible to get out of the present situation is in the establishment of a tin smelter in the United States in which to smelt Bolivian tin ores and such small lots of American ore as are produced. At present between 30,000 and 40,000 tons of tin concentrates carrying more than 20,000 tons of metallic tin are shipped each year from Bolivia to Europe for smelting.

The United States would absorb the tin smelted from this ore easily, and it has been demonstrated that there are no difficulties in the smelting of the Bolivian ores that American metallurgists cannot meet. Owing to the lack of European freighters, Bolivian ores will now be seeking a market, and, provided that ships can be found to carry the ore, this will be the opportunity for Americans to begin purchasing the ores that have heretofore gone to Europe.

The copper industry feels the effect of the war more than any other American metal industry. No figures have been announced by the copper producers for the past two months, and guess-work has to be resorted to in order to know the condition of the supply.

For five years domestic consumers have taken only about 63 to 67 per cent. of the copper produced from mines within the United States, so it is evident that there must be a material curtailment of producton while present conditions prevail. Considerable copper is, of course, consumed in munitions of war and for other military purposes, but the constructive arts of peace are far more favorable for the copper industry than the destructive art of war.

American producers have already greatly curtailed their production, and it seems almost certain that the output must be materially restricted for an indefinite period, dependent largely on the European conditions.



BLIND ADVERTISING

To the Editor of the Metal Industry:

Before national advertising was reduced to a science, it was a common practice for a man that wanted to sell refrigerators to give his advertising a catchy heading followed by a long preamble in which the torrid zone was compared with absolute zero, followed by figures to prove the great saving of money, time, and even human life if every family could be provided with a little box full of absolute zero. The advertisement would finally wind up with a little hint or suggestion that the nearest known approach to such an ideal condition would be for every family to own one of the world famous "Kooler" refrigerators! Happily, the form of blind advertising referred to has become obsolete except in rare cases when it is desirable to scare or encourage an afflicted reader and exploit the wonderful curative powers of some patent medicine at one and the same time.

It is with sincere regret that I note that various manufacturing chemists and jobbers in platers' supplies are either trying to rejuvenate the old method of blind advertising or the men they have chosen as their representatives are woefully lacking in technical knowledge concerning the chemicals they are trying to persuade the plater to discard and buy something that costs much more, but by a little skillful juggling of figures and symbols is proved (?) to be cheaper in the end.

The article entitled "Side Lights on Plating Costs,"* is a good example of blind advertising, the only trouble with it being that the author was a little too zealous, and seemed to forget that all the most expert electro chemists read the trade journals, making them a very unsafe place to make misstatements or even mistakes in.

When I read the article I felt sure expert nickel platers would promptly repudiate the author's statements, thereby counteracting to a great extent the harm done. I think I am safe in adding that later developments proved my judgment correct.

In the July issue of your valuable paper we are told that F. A. Rojas has discovered a nickel plating solution that "fully satisfies all the requirements that are desired for the successful workings of nickel plating." Incidentally, we are reminded, or made to assume, that "electrochroma" is still alive, and there

*The Metal Industry, April, 1914.

is such a thing as the Rojas Direct Ampere Rheostat. If the article was not intended to serve as an advertisement, just why did Mr. Rojas take the trouble to write it? Is he going to give us something worth while in the near future and intended his articles concerning the rheostat and nickel solution as a preliminary appetizer, or are we supposed to send him an order for a tank full of electrochroma within a resistance switch clamped on the inside?

Personally, I cannot conceive of a situation or condition in the plating room where it would be feasible or beneficial to place the resistance switch or rheostat inside the tank instead of outside, as usual. As for the nickel solution it certainly is a wonder if it substantiates all his claims; but what I am vitally interested in is: Can I lower the cost of production or improve the quality of the output of my department by buying his solutions?

I have always maintained that the surest way to get into all kinds of expensive trouble and jeopardize the quality of the output in any plating establishment is to buy the ready-made solutions or the so-called plating salts.

My opinions are based on an experience covering seventeen years' study and practical work, but if Mr. Rojas or anybody else can prove the contrary, I will gladly learn and give due credit to my teacher. My idea in writing this article is not to cast aspersions or "start something," but simply to call the ordinary plater's attention to the fact that the figures and conclusions arrived at in all articles, but especially in those written by agents for platers' supply houses, should be carefully studied before being accepted as positive facts.

OSCAR A. HILLMAN.

Attleboro, Mass., July 29, 1914.

[Note.—The Metal Industry is always ready to present both sides of a question. Articles may appear to have an advertising aspect, but they are published with a view to general enlightenment. Manufacturers and consumers have an equal right to state their views in these columns.—Ed.]

HYDROGEN PITTING ON NICKEL PLATE

TO THE EDITOR OF THE METAL INDUSTRY:

In Mr. J. Walters' article on "Nickeling" in the February number of THE METAL INDUSTRY, he advises that if nickel platers would follow his directions there would be no trouble re-hydrogen pitting. As I am the writer of the article "Re-pitting," Mr. Walters evidently thinks that I am the chief sufferer, but he is wrong, as I merely brought the matter up as I thought it would be of great interest to platers in general, seeing that hydrogen pitting can be found in every electro plating shop.

Mr. Walters' remedy is no remedy at all, and as regards stove grate work (which Mr. Walters says he has been plating for ten years) I should no more dream of looking for hydrogen pits on that class of work than I should on my pen nibs, which are also nickeled. I generally have found that stove grate work is naturally pitted, and it would be a mere waste of time looking for hydrogen pits. If Mr. Walters had been plating all classes of metal goods of different shapes and sizes instead of the one class of metal, I think he would not be so sure of his remedy; if he can keep on continually plating highly polished brass, copper, German silver, Britannia metal, steel, etc., and the wide range of surgical work, and keep deposition of nickel going for from two to six and seven hours, without a trace of hydrogen pitting on any single article, then I say his argument would be worth following, but as he does nothing but stove work, his opinion, to me personally, is useless.

I should advise Mr. Walters to read up his back numbers of THE METAL INDUSTRY, and he will find in several technical articles, written by electro chemists, etc., that the liberation of hydrogen gas at the cathode, and the pitting which results therefrom, has received their attention, but no cure. If Mr. Walters will watch the hydrogen gas at the cathode by means of lantern and screen he will find that the gas is first liberated at the bottom of article, and the longer deposition takes place so will the gas accumulate, and gradually one bubble will cling to another, and so the process goes on from the bottom to the top of cathode. Some bubbles break away, but if only one gas bubble stays the whole time of deposition the pinhole will be found (as I mentioned in my last letter on this subject), and that is what happens in the workshop practice.

Mr. T. Lane's letter is really interesting, and he has evidently given the subject his thoughtful consideration, and I am sorry to differ with him as I think his suggestion which is, going over the articles with a soft mop every half hour or so and removing bubbles, is not so good as the action of lifting up of cathode rods and "washing" the bubbles off. As regards size of work it is immaterial if the articles are one foot in length or seven feet in length, the one or two up and down motions of cathode will rinse all the work on the one rod. I think the pitting referred to by Mr. Lane, which had been mechanically agitated during nickeling, is due to the same cause as sometimes happens to work that has been silver plated, and that is having too much power on the vats.

I am very much afraid that a plater with several hundred pieces of different metals plating in different vats would not have much time to follow out Mr. Lane's suggestion. I know he would find it easier to just life cathode rods up as required.

JOHN W. CORTEEN,
Plater and Gilder, The Plating Company, Ltd.,
Sheffield and London.

88 Denmark Road, Heeley, Sheffield, August 14, 1914.

NEW BOOKS

ART METALWORK—WITH INEXPENSIVE EQUIPMENT.—By Arthur F. Payne. Size 6½ x 9½ inches. 186 pages. 159 illustrations. Bound in cloth. Published by the Manual Arts Press. Price, $1.50. For sale by THE METAL INDUSTRY.

This book was written by a practical art metal worker, expert craftsman and experienced teacher; one who understands the needs of the manual training teacher. It contains detailed information for the teacher introducing art metalwork into his courses.

Part I deals mainly with materials and equipment describing the production of copper, the ores, the methods of extracting, the commercial forms, and copper alloys. It also tells how to color and finish art metalwork, and the sources of materials and equipment. Part II deals with problems, describing in detail all the processes to be followed in making articles varying from a watch fob to a silver loving cup, including etching, piercing, annealing, planishing, modeling, chasing, enameling, spoon making, etc., etc. It tells about new methods of construction, new finishes and new problems. It also gives methods and valuable information that have hitherto been guarded as trade secrets. Beautiful illustrations show work done by students under ordinary school conditions in a manual training shop. It shows tools, processes, and the most practical inexpensive equipment of the practical craftsman.

THE METALLURGY OF THE NON-FERROUS METALS.—By Professor W. Gowland. Size 6¼ x 9 inches. 500 pages, including index. 192 illustrations. Bound in cloth. Published by J. B. Lippincott Company. Price, $5.00 net. For sale by THE METAL INDUSTRY.

In the present volume an effort has been made to supply students and metallurgists with a concise treatise dealing with the principles on which the various processes which concern the non-ferrous metals are based, and with the manner in which the processes are carried out in typical modern work.

The general plan followed is to consider under the name of each metal (1) its physical and chemical properties; (2) the alloy of which it is the chief constituent; (3) the composition and applications of commercial brands, and the effects of substances which interfere with those applications; (4) the chief ores and the processes by which the metal is extracted from them or other sources, and refined or made suitable for industrial or other purposes; (5) the principles and conditions on which the success of these processes depend; (6) the furnaces and appliances employed in the processes, and chemical changes and reactions which occur in the operations; (7) examples of actual practice followed at the present time in important extraction works.

The aim of the book is not only to help the student, but the author has also in view a wider circle than those merely who are going through a course of metallurgical training, and hopes that others who are actually engaged in practical work may find its pages worth consulting.

Shop Problems

IN THIS DEPARTMENT WE ANSWER QUESTIONS RELATING TO SHOP PRACTICE OF THE METAL INDUSTRY. ADDRESS THE METAL INDUSTRY.

ALLOYING

Q.—We are in search of the formula for metal suitable for pattern work which will absolutely have no shrinkage. We have experimented with several and are familiar with several more which run high in lead, which we believe are apt to be too soft for the nature of the work which patterns for long service must do.

A.—There is no alloy for patterns that is absolutely free from shrinkage. A mixture of tin, 50; zinc, 45, and bismuth, 5, furnishes a very satisfactory pattern metal. It should be poured at a low heat and large gates used. While it is a rather expensive metal old patterns may be melted up and the metal used over again.—J. L. J. Problem 2,025.

ANNEALING

Q.—Inform me how to anneal and temper the following brands of high speed steel: Cyclone, Blue Chip, Novo and Rex. I am using the above brands of high speed steels to make bits and small tools to be used on brass, and I am having trouble in annealing and tempering them.

A.—You are using too many different brands. Adopt the one brand that gives you the best service. The following formula for annealing will apply to any of the brands you mention. To anneal, place the piece to be annealed in an iron pot or pipe. Pack steel chips around it ramming them tight or slacked lime may also be used, and then lute the receptacle with fireclay. Heat to a yellow and hold the temperature one hour; then bury the box in charcoal ashes until cold. If a blacksmith's forge is used with charcoal fuel, leave the steel in it to cool down with the fire.

The same brands can be successfully hardened by heating to a yellow white heat and quenching in a good size piece of beef suet. Plunge the piece into the suet and leave until cold. It will then be found hard and tough and good service will be given by the tool.—P. W. B. Problem 2,026.

BRONZING

Q.—Kindly advise me of a practical method of black oxidizing or bronzing aluminum. I wish to obtain a black matt permanent oxide or bronze that does not require to be lacquered afterwards.

A.—The only method you can use that we know of that will give you the black matt finish you require is to coat the articles with a black rubber finish lacquer, especially prepared for this purpose by several of the manufacturers of lacquers advertising in THE METAL INDUSTRY.

To produce a decided matt effect the articles would have to be previously sand blasted, using pumice stone, silica or sand as the abrasive, according to the fineness or coarseness of the matt required. The matt finish is also produced by spraying the lacquer on the articles. If the air pressure is properly regulated the matt can be produced as required. This is the method used by manufacturers of aluminum toilet articles.

Aluminum can be plated very satisfactorily with a black finish in the regular black nickel solution provided the surface is cleansed in the usual manner and dipped in clear nitric acid, washed in clean water and placed in immediate contact with the electro current. A voltage not exceeding 1 volt should be used, but the deposit must be protected by an ordinary lacquer.

A black bronze can be produced by immersing the aluminum articles in a solution consisting of the following:

Chloride of zinc	1 pound
Sulphate of copper	1 ounce
Hot water	1 gallon

Add a small amount of muriatic acid to clear the solution. Immerse the articles until sufficiently black, then remove, dry out carefully and immerse in hot linseed oil and then dry out by heat or lacquer in the usual manner.—C. H. P. Problem 2,027.

CUTTING

Q.—We have tried high speed steel in making our taps and thread chasers, but they do not work satisfactorily. What is the best brand of high speed steel to use for cutting brass?

A.—High speed steel does not work satisfactorily on brass, as taps or thread chasers have a tendency to stick to the work. High speed steel, owing to its coarse grained texture, makes the work rough where carbon steel makes a nice smooth job.

Where a large production rather than quality is desired, of course high speed steel has the advantage, but where quality rather than quantity is desired carbon steel should be used. By using high speed steel you can increase the speed of your machines and increase production, although high quality finish and the highest speed do not go together.—P. W. B. Problem 2,028.

DEPOSITING

Q.—Is there an acid lead solution that will give a good heavy deposit of lead? Caustic lead solutions give very poor results.

A.—We suggest that the following acid solutions be tried if you find that alkaline solutions do not give satisfactory results.

ACETATE OF LEAD SOLUTION.

Water	1	gallon
Acetate of lead	9	ounces
Acetic acid	4	ounces
Common glue	1½	ounces

LEAD PERCHLORATE SOLUTION.

Water	1 gallon
Lead perchlorate	1 pound
Perchloric acid	½ ounce
Common glue	1 ounce

Problem 2029. —C. H. P.

FINISHING

Q.—Could you give me any information as to how the finish is obtained on the enclosed dial?

A.—We are under the impression that the dial submitted to us as a sample is finished in the following manner:

The brass sheets are lightly sand blasted or acid dipped to produce the light matt finish; then silvered in a solution low in silver and cyanide so that a thin and very white deposit is obtained. The silvered surface is then coated with a resist. Common resin dissolved in benzine is frequently used for the purpose and a very thin coating applied.

The varnish is eaten through by applying a rubber stamp moistened with caustic soda to produce the outline of the numbers. The exposed surface is then etched using chloride of iron and chlorate of potash. After the etching the sheets are given a light acid dip to brighten up the etched numbers. The sheets are then immersed in a regular carbonate of copper and ammonia oxidizing dip to produce the black in the letters. The silver is unaffected during these operations. The resin varnish resist is then removed with benzine and the sheets are dried in fine maple sawdust and finely lacquered with a transparent lacquer.—C. H. P. Problem 2,030.

MELTING

Q.—After melting a mixture of copper, 90; zinc, 7, and tin, 3, white spots appear on the surface which look like

zinc spots. They are not tin because they turn black when dipped and colored. I use the best of metals and good crucibles. What do you think causes the trouble?

A.—The spots in question may be due to segregation or poor mixing. Try melting hot and thorough stirring with a black lead stirrer. If an iron stirring bar is used it is liable to introduce enough iron into the alloy to contaminate the mixture.—J. L. J. Problem 2,031.

MIXING

Q.—We are making bronze bearings for high-grade drill presses and would like to find out what mixture would give the best results regardless of price. The bearings are for the spindles of the press and these spindles run at varying speeds, sometimes as high as 2,500 revolutions per minute. They also are subject to tremendous strain and some that we have furnished have begun to show wear after eight or nine months' service. We are now using a mixture of copper, 81; zinc, 2; tin, 10; lead, 8, and phosphor, .25 to .30, and would like to ask your opinion regarding same as to durability and anti-frictional qualities. Do you think it would be advisable to increase the lead and cut out the zinc?

A.—Standard phosphor bronze will give good results in the situation you mention. Use an alloy of copper, 77; tin, 10; lead, 10, and 15 per cent. phosphor copper, 3. By casting this alloy in "sticks" in an iron mold you will get a tougher and stronger metal that can be handled to advantage on screw machines.—J. L. J. Problem 2,032.

MOLDING

Q.—Please let me know a mixture of core sand for small brass swivels and bibbs, as I have trouble with the work. Also a core sand for heavy valves that will drop out without much hammering.

A.—A good core sand mixture for swivels, bibbs and valves is:

Old molding sand	1 part
Beach or rock sand	2 parts

Temper with glutrine or molasses water and add a small amount of core oil in addition to the molasses water. Add one part of oil and 100 parts sand.

The molasses water can be made strong or weak, according to the core, for instance, small cores 50 parts water and 1 part molasses.—W. L. R. Problem 2,033.

OXIDIZING

Q.—I am sending you under separate cover a sample of French bronze oxidized finish, the composition of which is 1½ ounces chloride of potash and 1½ ounces of sulphate of copper, making one gallon. I desire something in a darker brown than that shown in sample. Can you furnish the information as to how this darker finish can be obtained?

A.—If you intend to use the brown finish on bronze metal same as sample then a brown tone can be readily produced upon the surface by the aid of sulphide of barium and ammonia. A solution consisting of the following proportions should answer your purpose:

Sulphide of barium	1 ounce
Water ammonia	¼ ounce
Hot water	1 gallon

To produce the color the cleansed articles should be immersed in the hot solution for a few moments, then removed, washed in cold water and immersed in boiling water, dry out and scratch brush lightly. If the tone is too light immerse in the solution again for an instant, then remove, wash and dry, but do not scratch brush. If the second immersion produces too dark a brown take a pint of the dip and add to a gallon of cold water and use this for the third immersion or toning dip.

Your present color can be made darker if you use a very dilute solution of the barium sulphide in water and omit the ammonia. Immerse the articles for a second or two and dryout without scratch brushing. The lacquer should then bring up the correct shade.—C. H. P. Problem 2,034.

SCALING

Q.—Will you kindly answer the following question: I am using sulphuric acid and bichromate of soda as a fire scale for sterling silver flat ware. It works very well, but leaves a smut on the die after striking. How can I remedy that?

A.—To overcome the difficulty you experience we suggest that, after removing the fire scale and washing in cold and boiling water, you immerse the articles in a bath consisting of water, 1 gallon, and 4 ounces of platers' compound (Swan & Finch, New York, manufacturers). Maintain the solution just below the boiling point. Dry the articles out afterwards by heat, if necessary. This will overcome your trouble.—C. H. P. Problem 2,035.

SMELTING

Q.—In our works we use a large quantity of casting metal composed of tin, lead and antimony. From this metal we get a lot of dross-skimmings, sweepings, etc. Hitherto we have burnt the dross to extract the metal, but we think it very possible that you know of some newer and up-to-date method of extracting the metal from the dross. We shall be glad for any help you can give us.

A.—The most satisfactory method of treating white metal drosses is to smelt the same in an open hearth or a reverberatory furnace in heats of 3,000 to 6,000 pounds, using 10 per cent. of hard coal as a reducing agent. Small amounts of soda ash or other flux may be added, depending upon the inert material to be fluxed. A temperature of at least 2,500 degs. Fahrenheit is necessary for the complete reduction of such drosses.—J. L. J. Problem 2,036.

SPRAYING

Q.—We recently heard of a new process of finishing metal articles, etc., by spraying them with a solution of celluloid. Can you give me any information regarding this solution?

A.—The method you refer to is largely used in the United States. It consists of spraying the articles with celluloid enamels of any color or tone. Electric lights, table fixtures, chandeliers, cabinet hardware and various other articles are finished in this manner.

Antique tones are produced by applying thin pigment colors to the enameled surface when thoroughly dry. For example: A portable gas or electric fixture for table use is to be finished in burnt or green ivory. The fixture is made from a casting of spelter, antimonial lead or gray iron. The articles do not require to be polished as highly as for regular plating, but the surface should be smooth. The fixtures are then cleansed, plated for a few minutes in a cyanide copper or brass bath, washed and placed in a silver bath with a weak current for a few seconds, or until the copper deposit becomes coated with a thin film of silver. The articles are then washed and dried thoroughly and when a cold cream colored celluloid enamel is sprayed upon the surface. When this coating becomes hard a small amount of brown sienna and orange chrome should be dissolved in turpentine, to which is added a few drops of gold size. The amount of the two colors used depends upon the burnt tone desired.

This thin fluid color is applied all over the article previously colored with the cream enamel and is then allowed to dry for a short time. A soft brush should be used for applying the color. The excess of color is then removed from the high lights of the fixture by rags lightly moinstened with a mixture of boiled linseed oil and turpentine. When this is accomplished the fixture has the appearance of burnt ivory.

In like manner dry chrome green pigments may be used and applied to produce green ivory or any other colored enamel may be applied. The secondary color is applied as a pigment to produce any contrasting tone or color required. While not absolutely necessary to plate the articles, as mentioned, for light colored enamels it saves applying a second coat. Articles that are coated with darker enamels may be applied direct to the previously cleaned surface without plating.—C. H. P. Problem 2,037.

PATENTS

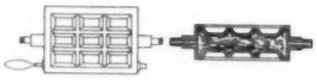
REVIEW OF CURRENT PATENTS OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

1,100,827. June 23, 1914. **Metal Furnace.** Isaiah Hall, Birmingham, England.

This invention relates to furnaces for melting metal, more especially such as are used for the melting of used metal, cleansing it and subsequently casting it into ingots; and is particularly adapted for use in the melting of type metal and subsequently casting it into ingots.

The object of this invention is to provide more convenient means, as shown in cut, for pouring the metal into ingots, and for cooling and ejecting the same.

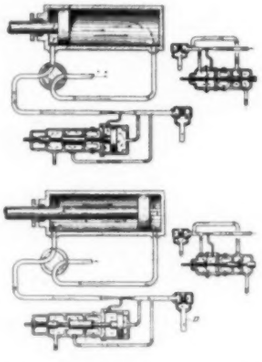
One of the claims of this patent is:



In casting apparatus attached to a metal furnace the combination of brackets having recesses formed on their upper surface; a hollow mold having recess upon its upper surface and underside for receiving the molten metal; discharge and delivery pipes for circulating cooling water through the mold; said pipes forming pivots turning with the mold and resting in recesses upon the brackets; flexible piping directly connected to said discharge and delivery pipes; and a handle upon the side of the mold for inverting the mold and adapted to rest upon either side of the recess wherein the pivot rests, thus positively limiting the motion of the mold to a rotation through 180 degrees alternately in either direction.

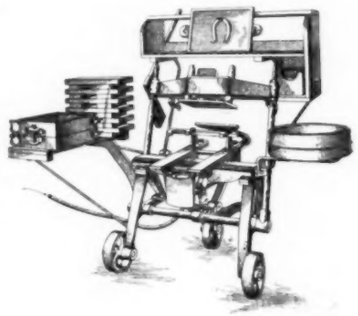
1,103,037. July 14, 1914. **Controlling Mechanism for Hydraulic Presses and the Like.** Walter R. Clarke, of Bridgeport, Conn. Assignor to Bridgeport Brass Company, of Bridgeport, Conn.

This invention relates to controlling mechanism for hydraulic presses, draw benches, and other machinery operated by fluid pressure, and it refers especially to controlling mechanism for machines in which a ram or other moving part is arranged for operation by fluid under high pressure or fluid from a source of low pressure, or fluid from both high and low pressure sources. Usually, the reciprocating ram or other member ordinarily employed for acting on the work is actuated by low pressure until the tool meets the work, and then water under high pressure is permitted to act on the ram in order to perform the working stroke, the return stroke being effected under low pressure. Ordinarily the low pressure water acts much more quickly than the high pressure water, so that considerable time is saved by having the low pressure water produce the return stroke of the ram or other member and the idle portion of the operative stroke, i. e., that portion of the operative stroke which precedes the meeting of the tool with the work. The object of the invention is to provide a simple, efficient system, as shown in cut, for automatically changing over from high to low pressure and vice versa in order to meet the above conditions.



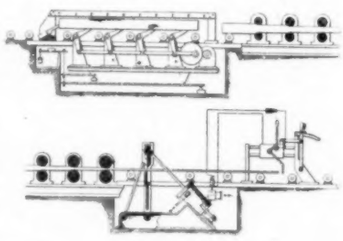
1,103,454. July 14, 1914. **Molding Machine.** Henry Tscherning, of Freeport, Ill. Assignor to Arcade Manufacturing Company, of Freeport, Ill.

The present device is designed to be used with a pattern-plate of the type having half the pattern in relief on each side, so that by placing the plate between the cope and drag, filling cope and drag with sand and squeezing the whole, the two halves of the mold are made at one operation. In the use of the machine, the pattern-plate is placed in position between the two halves of the flask, which may be and preferably is a snap-flask, and the flask is placed on the bars with the drag up, the head being swung back out of the way. The drag is first filled with sand in the usual manner—that is, by riddling sand onto the pattern-plate to make a sufficient layer, doing whatever tucking in deep parts of the pattern may be necessary by hand, then shoveling the rest of the sand into place, striking off, and putting the follower-board in position. The flask is then turned over so that the follower-board rests on the bars and the empty cope is up. The cope is then filled with sand in the same manner and a second follower-board is placed upon it. The head is then swung forward and the squeezer-plate brought down by manipulation of the handle, it being understood that when this operation is performed, the flask is accurately positioned by engagement with the flask-guide. The operation of the squeezer-plate compresses the sand within the mold to the requisite degree and the squeezer-plate is then elevated and the head swung back. This completes the making of the mold, but to use it, it is necessary that these halves be separated and the pattern-plate removed, which brings into operation the rapping mechanism.



1,104,349. July 21, 1914. **Rolling Mill Plant.** Victor E. Edwards, of Worcester, Mass. Assignor to Morgan Construction Company, of Worcester, Mass., a corporation of Massachusetts.

The present invention relates to apparatus adapted for the uninterrupted rolling of a large ingot or bloom into a finished product of greatly reduced cross sectional area, and the cutting of the latter into pieces of equal and convenient length.



Heretofore it has been the practice to introduce each bloom or ingot to a continuous series of reducing rolls, and to cut by means of a suitable shearing mechanism the product emerging from the last finishing rolls into pieces of equal length, as determined by a previous and wholly arbitrary adjustment of the shearing mechanism.

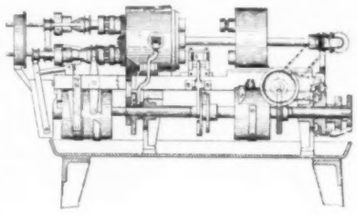
Owing to the difference in the amount of metal contained in the blooms, which are found sometimes to vary several hundred pounds in weight, it has heretofore been impracticable to produce a number of pieces from a single bloom without having a remainder of less length than one of said

pieces, known as a "short," which frequently represents waste material, and in a mill of even an ordinary capacity the daily waste occasioned by the formation of these "shorts" is considerable.

It is the purpose of the present invention to practically eliminate the formation of "shorts" by cutting the pieces of such a length that the metal of the bloom will substantially all be used when the last piece is cut. To this end the present invention contemplates the interposition of means, as shown in cut, in front of the reducing rolls for ascertaining the amount of metal in each bloom, so that the length to which the product of such bloom can be cut, without the formation of a short, can be obtained from a table, or readily computed, and the shearing mechanism adjusted accordingly.

1,104,147. July 21, 1914. **Metal-Working Machine.** O. A. Smith, Cleveland, Ohio. Assignor to National Acme Manufacturing Company, of the same place.

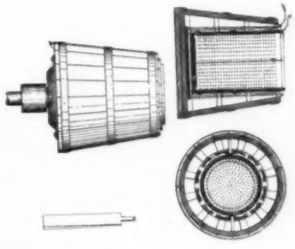
This invention relates to metal working machines of that class known as automatic or multiple spindle screw machines, the object of the invention being to provide a machine of this class having improved means, as shown in cut, for revolving or indexing the work spindle turret at a rapid or accelerated speed, whereby the production of the machine is materially increased.



A further object of the invention is the provision, in a multiple spindle screw machine, of a two-part driving or cam shaft, said shafts carrying mechanism whereby the rotation of one will be controlled by the other and whereby one shaft may remain idle during a predetermined period while the other is rotating and will have increased speed as compared with the other during another predetermined period, thereby to index the turret rapidly.

1,105,292. July 28, 1914. **Apparatus for Electro-Plating and the Like.** Arthur Murphy, of Quincy, Mass.

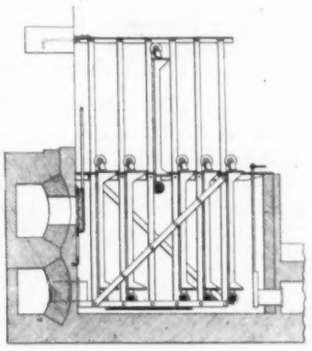
This invention relates to an apparatus especially applicable among other uses, to be employed for electroplating purposes, and especially for plating all small articles, such as rivets, lacking hooks, eyes and the like.



The present invention has for its object to provide an apparatus, as shown in the cut, with which a more uniform plating at a minimum cost may be effected. To this end, the apparatus is provided with a rotatable outer receptacle or vessel, preferably in the form of a conical barrel, which is open at its upper end, and within which is located a perforated inner vessel or receptacle, which is preferably cylindrical in shape and is designed to hold the work to be treated. The inner vessel is preferably connected with the outer vessel to rotate therewith, and contains a cathode element, which is fixed thereto to revolve therewith, and the outer vessel contains within it, an anode element, which is secured in fixed relation to the outer vessel and is located in close proximity to the inner vessel and to the cathode element therein, so that said cathode and anode elements are in close proximity to each other, whereby the resistance offered to the passage of the current through the electrolyte which is contained in both element, which is fixed thereto to revolve theerwith, and the inner vessel permit the electrolyte to circulate through the inner vessel as the outer and inner vessels are revolved, which enables the solution or electrolyte in contact with the work to be maintained at a substantially uniform strength, whereby uniformity in the work is assured.

1,107,678. August 18, 1914. **Drawer-Type Core-Oven.** A. M. Loudon, Elmira, N. Y., assignor to Whiting Foundry Equipment Company, Harvey, Ill.

This invention relates to core ovens provided with a plurality of drawers for the cores, each slidable into and out of the oven, independently of other drawers and other parts of the device.



The object of this invention is to provide an oven of this type, as shown in cut, in which the supporting devices are so arranged that one or more drawers may be partially or wholly withdrawn from the oven, each entirely independent of the other and still be so supported as not to interfere with the free access of workmen to the drawer or drawers of an adjoining oven for the purpose of either inserting or removing cores or other materials therefrom. The invention consists of a device capable of carrying out the foregoing objects, which can be easily and cheaply made, and is satisfactory in operation and not readily liable to get out of order.

1,107,865. August 18, 1914. **Process for Welding Copper.** H. Suzuki, Shibaku, Tokyo, Japan.

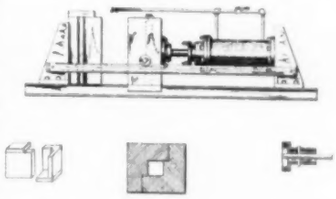
To weld copper pieces by this process, a heating vessel, or so called muffle, made of refractory material is placed in a furnace, and the vessel is closed with a cover to prevent air and hot gases entering it. The bottom of the vessel is prepared with pieces of charcoal in a proper thickness and specimens are placed on this charcoal bed, and the outside of the vessel is heated in the furnace.

The welding surfaces of the specimen should be polished or cleaned by acid solution, and the pieces put together, before placing them in the vessel. If the specimen consists of several pieces and is to be welded to one, the pieces should be tied together. Then the specimen is heated on the charcoal bed, but every piece of the specimen should never be allowed to touch the interior wall of the vessel.

When the specimens are at a proper welding heat, they are taken out and quickly hammered or rolled in the ordinary way. In welding, the lower but fit for welding heat gives the better result and ammonium carbonate or ammonium chlorid may be used as a welding compound, but it is not necessary to use them when this new process is carried out with care, in which case perfect welding can be done.

1,107,905. August 18, 1914. **Art of Casting Metals.** A. M. Craigs, New Haven, Conn.

This invention relates to improvements in the art of casting metals, and the object of the invention is to produce a method or improvement in the art whereby metals can be rapidly cast, the metal of the casting compressed during the operation so that an exceedingly dense casting will be produced, to provide means of leaving the surface of the casting smooth, to utilize metal molds for this purpose, to compress the metal so that the reaction caused by the swell of the poured metal and the expansion of the mold, can be taken up without injury to either casting or mold, and use air pressure in such a way that the exhaust from the air pressure device can be utilized to chill the mold and cool the casting.



The inventor uses a two-part mold, as shown in cut, which is expansible both laterally and longitudinally, and which consequently when pressure is applied to the mold, permits of compression in all directions. He uses an air engine for effecting the compression so that the reaction caused by the swelling of the poured metal or mold will act against the air and he can utilize the engine exhaust for cooling the mold and metal.

EQUIPMENT

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

INTERESTING MACHINERY EXHIBITED AT CHICAGO CONVENTION

PATTERNMAKER'S DISC GRINDER AND ROLL SANDER

A No. 20 combination patternmaker's machine is a recent product of the Gardner Machine Company, Beloit, Wis., and is shown in the accompanying illustrations in the motor driven type. Fig. 1 is the front view of the machine, the left hand end carries a 30-inch diameter disc wheel to the face of which is at-

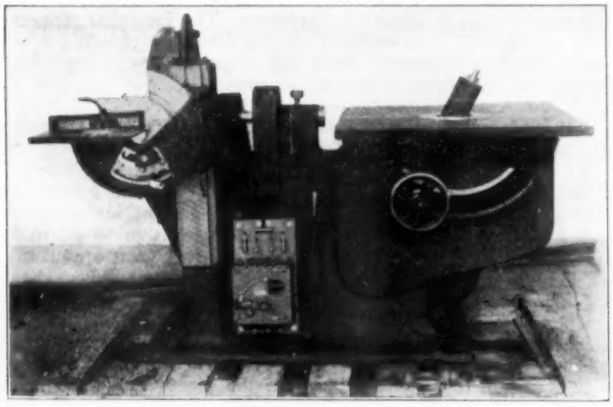


FIG. 1. FRONT VIEW.

tached a 30-inch diameter garnet paper disc. The universal work table has angular adjustment to the face of the wheel of 45 degrees in either direction. This tilting arrangement is so constructed that the inside edge of the work table always re-

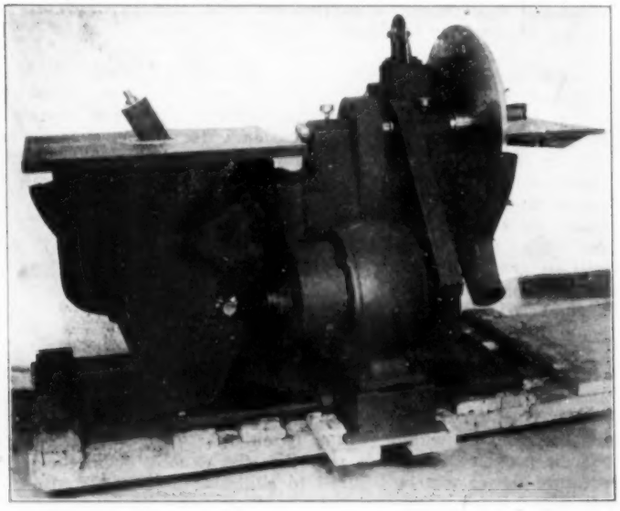


FIG. 2. BACK VIEW.

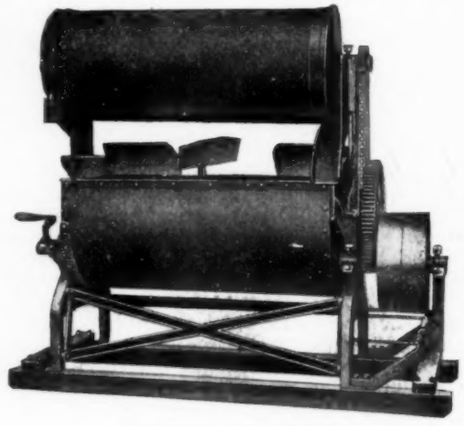
mains close to the grinding disc, irrespective of the angular position of the table. This table can also be raised and lowered on the dovetailed way on column. Three work gauges are supplied with each machine, the universal angle gauge being shown in position on the work table. All angular adjustments are accurately indicated by large graduations in plain view of the operator. The right hand end of the machine is devoted to the sanding roll. This sanding roll may be tilted to any angle 45 degrees each side of perpendicular. A graduated segment directly behind end wheel indicates the desired angle.

It should be noted that the work table always remains horizontal regardless of the angular position of the sanding roll. Provision is made for altering the speed of the sanding roll spindle from 2,000 to 6,000 r. p. m. Four sanding rolls are furnished with each machine. Each roll is 7 inches long and are made in 2, 3, 4 and 6 inches diameter. These rolls, which are made of cast aluminum, and perfectly balanced, are faced with garnet paper. If the main spindle of the machine is in operation the sanding roll can be started or stopped at will, the clutch lever controlling same being mounted directly in front of the machine. It should be further stated that the sanding roll has a reciprocating up and down motion of 5/16 inch, which assists in the more rapid removal of stock. A 5 h. p. fully enclosed motor is used for driving the main spindle of this machine, and is connected to same by means of a silent chain. The sanding roll is driven through a friction disc. The silent chain and all belts are completely incased with guards. The starting box, as will be seen in Fig. 1, is mounted directly on the front of machine base. The whole equipment weighs 3,300 pounds.

BLYSTONE SAND MIXER

The Blystone Machinery Company, Cambridge Springs, Pa., exhibited the machine shown in the cut which is known as the Blystone sand mixer. This machine is claimed by the manufacturer to mix core sand and facing more thoroughly and rapidly than has been possible by any former methods and it will mix more sand when tended by one man than could be handled by three or four men mixing by hand.

The success of the Blystone machine is attributed to its mixing on correct principles. It shovels the batch over forty times a minute, and shifts it from one end of the drum to the other with every revolution of the shaft. It is stated that the



BLYSTONE SAND MIXER.

material does not need to be put in one end of the machine and travel through it in order to get thoroughly mixed. The sand is thrown in at either end or in the center and it begins to be worked upon instantly, no matter where it falls.

One of the important advantages claimed for the Blystone machine is that the drum is all open, thus enabling the operator to see the sand constantly and there is also no part of the Blystone that cannot be seen at any moment of its operation. Some of the specifications for this machine are as follows:

The Blystone requires three horsepower for its operation.

Capacity, ¼ cubic yard (equalling 500 to 800 pounds) per batch; 75 tons per day.

Floor space required, 3 feet by 7 feet.

Height of mixing drum at intake, 40 inches. Height of screen at intake, 50 inches. Tight and loose pulleys, 18 inches diameters, 4-inch face. For best results should be driven 150 R. P. M.

Frame, best quality gray iron castings.

Mixing drum, No. 8 gauge Bessemer steel plate.

Paddle blades, No. 6 gauge 50 carbon steel; paddle arms, semi-steel; paddle shaft, 2-inch hexagon cold rolled steel.

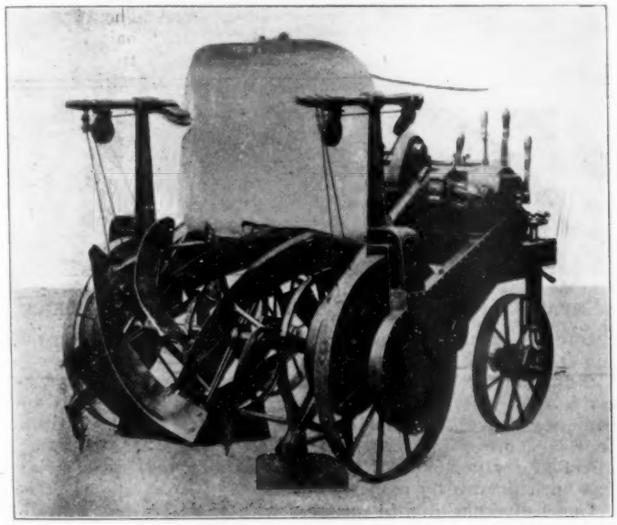
Driving gear, extra heavy and cast from cut patterns; best that can be made. Key-seated and set-screwed to countershaft.

Driving pinion, cut steel. Bearings, all babbitted and well protected against sand and dirt.

AUTO SAND CUTTING MACHINE

The machine shown in the cut attracted a good deal of attention at the exhibition, and was shown by The Sand Mixing Machine Company, 220 Broadway, New York, N. Y.

This machine is used for cutting molding sand. It is self-propelled by an electric motor mounted thereon, and is driven



AUTO SAND CUTTING MACHINE.

all through the foundry and cuts the sand where it lies for floor-molding, while for stationary bench or machine-molding it cuts and piles the sand alongside the machine. The sand is put in much more perfect molding condition than could be done with the shovel, which is the usual method, and results in smoother castings and smaller loss, as well as larger output, because it is so much looser and more perfectly mixed that it shovels easier and rams more uniformly. In addition to cutting molding sand it is also used by a great many foundrymen for mixing all of their core sands and facing sands, and it is claimed to be much faster and more effective for that work than the usual run of machines used for the purpose.

OFFICE COMPTOMETER

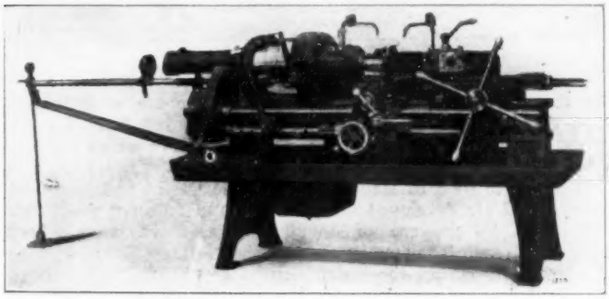
The accounting office is a department common to all lines of business. It is one, too, in which the possibilities of economy have until within recent years been sadly neglected. The time and labor saving advantages of efficient methods and equipment in this important department of business were shown in the booth of Felt & Tarrant Manufacturing Company, Chicago, Ill., where the application of the Comptometer adding and calculating machine to all the various forms of figure work was demonstrated in a practical way. Emphasis was laid upon the speed and accuracy of this machine on additions; also its ready adaptability to all other work, including multiplication, division and subtraction. As a test of its practical service in foundry and other metal working offices, every day problems of accounting in billing, inventory, payroll, cost and percentage were worked out with surprising speed and accuracy by the demonstrators. A feature of particular interest was the safeguard against oper-

ating errors provided in the controller key. The effect of the controller key is to automatically halt the operator the instant any key is misoperated. By its own action the machine automatically enforces accurate operation—leaves nothing to the hazards and inexperience of the operator. For if misoperated, the machine absolutely refuses to do another lick of work until the error is corrected.

The claims which the company makes for the all around service and efficiency of the Comptometer are well supported by the large number of machines in use by well known firms in the metal industry.

NO. 4 UNIVERSAL TURRET SCREW MACHINE

The Warner & Swasey Company, Cleveland, Ohio, exhibited at their booth the Universal turret screw machine shown in the cut and which is said to be the only machine of its type being built in America today. This machine is equipped with power longitudinal feed for carriage and arranged for chasing threads with the carriage. The feeds for



UNIVERSAL TURRET SCREW MACHINE WITH BAR EQUIPMENT.

the carriage and turret are independent, thus making it possible to use which ever feed that is best adapted for either member. Equal facility in the manufacture of duplicate parts

from bar stock, castings and forgings with the simultaneous power operation of both carriage and turret. These features make it, therefore, within its range, a distinctly universal machine. As many as eleven tools can be used at one time, and the machine is equally adaptable for manufacturing in large or small quantities.

It is distinguished by the following desirable features:

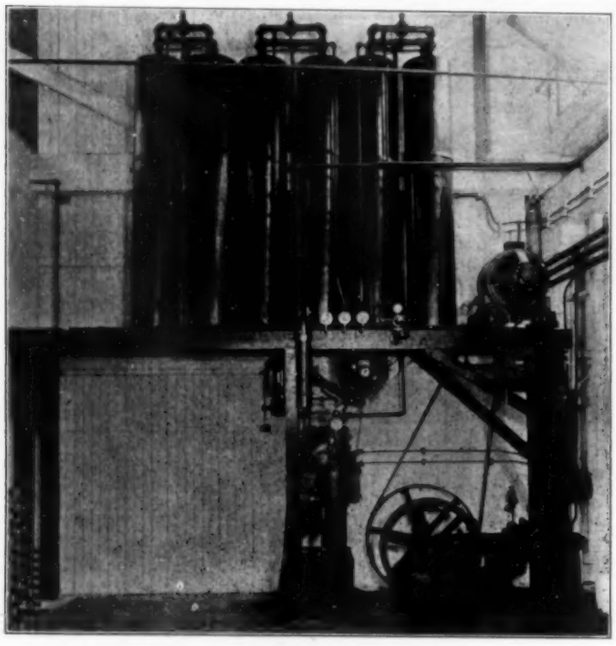
Power longitudinal and cross feeds for carriage; independent power longitudinal feeds for turret; eight feed changes; screw cutting carriage, arranged for subsequent addition of taper attachment; cone or single pulley all geared drive; exceptional equipment of standard tools.

The above machine is new and has been on the market only a few months. The Warner & Swasey Company also exhibited their No. 3A Universal hollow hexagon turret lathe and 18-inch Universal brass turret lathe, circulars of which will be sent upon request.

GAS FOR LEAD BURNING*

About a year ago, Walter L. Thompson, of the New York Service Station of the Philadelphia Storage Battery Company, installed the first experimental plant for lead burning for the manufacture and repair of electric storage batteries, using ordinary city gas in connection with compressed air admixed with a certain percentage of oxygen.

The service of this first installation proved successful from a technical as well as from an economical standpoint. The very aggressive management of the Philadelphia Works of this same company saw very quickly the decided advantages to be obtained



LEAD BURNING PLANT OPERATED BY GAS.

by the use of city gas as compared with the use of hydrogen, and decided to erect a large installation of this kind for the manufacture of storage batteries, a photograph of which installation is shown herewith.

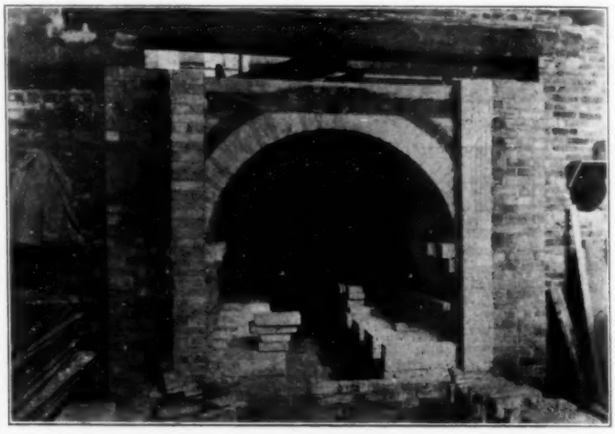
The old method of lead burning by the use of hydrogen and compressed air developed many detrimental features which are eliminated by the use of illuminating gas. In cities where municipal explosive commissions and the National Board of Fire Underwriters curtail the installation of generators, tank service besides being very cumbersome is extremely expensive. Data is available today showing where approximately monthly costs of $175 for tank service have been reduced to less than $40 by the use of city gas in connection with pure oxygen where such smaller installations were made on account of the smaller initial expense of installation, eliminating the compressed air feature. Comparative data for the installation (the picture of which is shown herewith) and where for large manufacturing purposes, generators were used previously, a cost of $160 approximately per month has been reduced to less than $60 for an eighteen to twenty burner installation. But in the first figure of $160 only the actual outlay for material has been figured upon, and not the labor connected with the disagreeable features of cleaning the generators and the work and danger connected therewith.

*From the Monthly Bulletin of the National Commercial Gas Association.

NONPAREIL INSULATING BRICK

The Armstrong Cork Company, of Pittsburgh, Pa., are manufacturing a brick known as the Nonpareil insulating brick for use in melting and annealing furnaces and core, lacquering and mold drying ovens. The illustration shows the application of the Nonpareil insulating brick in a furnace for baking enamel on metal signs.

Three principal advantages attending the use of Nonpareil brick as enumerated by the Armstrong Company are as follows: Reduced fuel consumption due to the large reduction in heat lost by radiation; comfort to the workmen, which is quite an advantage where high temperatures are employed, and lightness in weight. This last is a special advantage



ANNEALING FURNACE INSULATED WITH NONPAREIL BRICK.

where the furnaces or ovens are designed to be placed on the upper floors of a building.

Nonpareil insulating brick have a very low heat conductivity and will only transmit one-tenth as much heat by radiation as will fire brick or common brick. In other words, four inches of Nonpareil brick have the same heat-retarding effect as forty inches of common brick or red brick. This has been proven by numerous tests.

Generally speaking, in furnaces with an inside temperature of over 500 degs., the company recommends that the insulating brick be placed on the outside of the interior lining of fire brick. The insulating brick, in turn, should be protected from abrasion by an outside casing of steel, red brick, or a half inch coating of cement mortar. In core and mold drying ovens where comparatively low temperatures are employed, fire brick need only be used for the fire box. The rest of the oven may safely be built of Nonpareil brick protected on the outside as noted above. It is said that the general practice in japanning and lacquering ovens is to place the brick between the inside and outside metal sheets of which the oven is made.

MELLEN CASTING MACHINE

It is to be noted with interest by those in the wire and metal industry that the Mellen Continuous Casting Machine for brass, copper, aluminum, etc., is now being placed on the market ready for commercial use.

It is stated that the machine produces wire rods in continuous lengths directly from the liquid metal, eliminating the usual process of rolling, and rods may be produced in any commercial length, size or shape. Wire drawn from the rods

produced by this machine are found, it is said, upon test, to be of the highest quality. Broad patent protection covering the invention has been secured by Grenville Mellen, of East Orange, New Jersey.

EXHAUST SYSTEMS

The Cleveland Blow Pipe and Manufacturing Company, 2096 West Third street, Cleveland, Ohio, is very much pleased with the reports they are receiving from various State Departments of Labor who have been inspecting their exhaust systems as installed in different factories. Many of the industrial States now require the factories to have dust collectors and fan exhausters for the sake of the health of the employees.

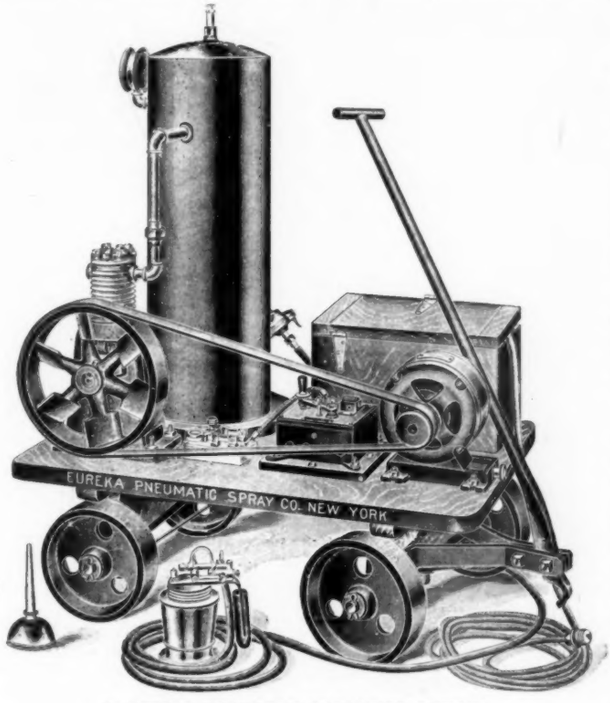
Among the letters received by the Cleveland Blow Pipe and Manufacturing Company is one from Fred C. Hayes, an inspector of the Department of Labor of the State of Michigan. The letter is written to the H. B. Sherman Manufacturing Company, of Battle Creek, Mich., and Mr. Hayes writes as follows:

"Replying to yours of the 20th relative to dust collector, will say that this department does not issue a certificate of inspection. However, will say that I have carefully inspected your newly installed dust collecting system and find it good and sufficient and entirely satisfactory and have so reported to the department at Lansing."

The installation consisted of twenty polishing and buffing wheels.

ELECTRIC PORTABLE SPRAYER

The apparatus shown in the cut is the latest advance in the use of paints, varnishes, enamels and lacquers. As can be seen it is a portable outfit for spraying these materials on either metal or non-metallic surfaces. There is a small electric motor which is capable of being run from any ordinary electric light socket and this motor operates the air compressor, compressing the air in the tank from which it is led to the sprayer shown on the floor in front of the truck.



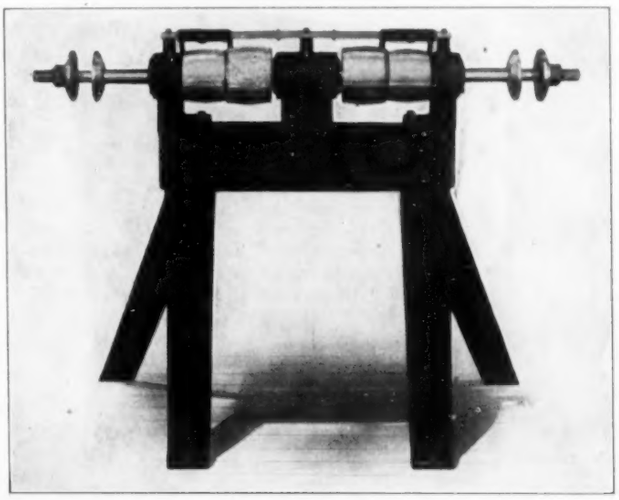
ELECTRIC PORTABLE SPRAYING OUTFIT.

It is claimed by the Eureka Pneumatic Spray Company, 64 Ninth avenue, New York, the manufacturer, that this machine is quiet in operation, the cost of power is the same as a single electric light and the rubber tired wheels will not injure the finest floor and by the use of the outfit, lacquering, bronzing, enameling, etc., can be done in one quarter of the time and at much less cost than by any other way.

NEW POLISHING AND BUFFING LATHE

This machine has two independent spindles mounted in double row self-aligning ball bearings, permitting stopping one spindle for change of wheels, etc., without disturbing the other and consequent loss of time.

Further, it is a well-known fact that polishing machines on account of the very high speed at which they are operated consume excessive power, to minimize which the machine illustrated was recently designed and built, and for which it is claimed that the power saving alone, aside from the saving in lubricant and great longevity of bearings, will in a short time amount to considerably more than the cost of these machines.

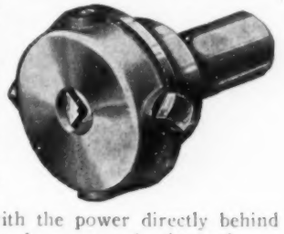


DOUBLE SPINDLE BALL BEARING POLISHING AND BUFFING LATHE.

Further particulars will be gladly furnished by the manufacturers, The Webster & Perks Tool Company, Springfield, Ohio.

COMPENSATING TURRET CHUCK

The chuck shown in the accompanying cut is known as the Smillie compensating turret chuck, or drill holder, for monitors, Fox lathes, turret lathes and screw machines. The Smillie chuck is not self-centering. It is compensating—expressly designed for setting tools either way from its own center when necessary to line up with the live spindle, thus making the tool setter independent of errors in alignment of level of turret, or both.



The chuck is set in the turret with the jaw slot either horizontal, vertical or at any angle necessary to cross center of the live spindle, and the jaws are adjusted either way to bring the tool to absolute center. Two extra wide, hardened tool steel jaws, with the power directly behind them, by two tool steel and hardened screws, grip the tool perfectly solid in any position desired. By loosening one screw only, the tool may be removed, ground and replaced without further adjustment.

Fine thread taps are set to cut straight holes and absolutely to size. This is an important point, as everyone knows that a few thousandths error in alignment of such taps will cause them to bore as well as tapping and leave oversize tapering holes. Reamers are quickly and easily set at a very considerable gain in production. Bent drills may be utilized for shallow holes by setting the shank off side enough to bring the point to center. Facing and boring tools are handled with equal convenience. Shank diameters as ordered—unless otherwise specified 1¼ inch is furnished.

The above chuck is manufactured by C. M. Smillie, 130 East Larned street, Detroit, Mich.

Associations and Societies

REPORTS OF THE CURRENT PROCEEDINGS OF THE METAL INDUSTRY ORGANIZATIONS.

AMERICAN INSTITUTE OF METALS

In an active campaign for increasing the membership of the Institute, President G. H. Clamer, during August, sent out the following letter

"At a recent meeting of the Executive Board of the Institute, ways and means were discussed for meeting the increased expenses which have resulted as a consequence of our greater activities and usefulness to our members. The increase in expenses is due mainly to the large size of Volume of Proceedings, as compared with former years. Naturally the most satisfactory plan is to increase the membership. This plan not only betters the financial condition but also stimulates the interest and activities of the Institute. It was suggested that, if each member could get just one more member, the activities of the Institute could be very greatly increased, and a wonderful amount of good work could be carried on."

The campaign suggested by Mr. Clamer was to end with the Chicago convention held last week and the results of this campaign are shown in the increase of the membership as reported at the convention by Secretary Corse.

AMERICAN ELECTRO-PLATERS' SOCIETY

New York Branch.—John Painter, recording secretary, reports that the regular monthly meeting was held at the Broadway Central Hotel, Friday evening, August 28. Mr. Edward T. Lawrence was elected to active membership. A permanent meeting place has not yet been secured and until further notice meetings will be held at the Broadway Central Hotel.

Note.—Secretaries of branch societies if they desire to have the activities of their societies noticed are requested to send in reports by the 1st of each month.—Ed.

AMERICAN ELECTRO CHEMICAL SOCIETY

The twenty-sixth general meeting of the American Electrochemical Society will be held in Niagara Falls from Thursday to Saturday, October 1 to 3, 1914. Headquarters will be at the Clifton Hotel, on the Canadian side.

PERSONALS

ITEMS OF INTEREST TO THE INDIVIDUAL.

George R. Coates, president and treasurer of the Genesee Metal Company, Rochester, N. Y., died August 29. Mr. Coates had been active in the metal business for over a quarter of a century.

Rockey Massicotte has taken charge of the plating department of the Kathodian Bronze Works, New York, N. Y., manufacturers of electric fixtures, art bronze and statuary.

George W. Jeffcott, 1118 Gresham street, St. Johns, Oregon, writes to THE METAL INDUSTRY that Rex J. Dryden, a polisher and plater, has been missing since July 16. His friends would welcome any information as to his whereabouts.

C. G. Backus, one of the best-known plating supply men in the trade, has arranged to take charge of the New York office of the Munning-Loeb Company, of Matawan, N. J. This office is at 50 Church street, where Mr. Backus will be glad to meet or hear from his old customers and friends.

DEATHS

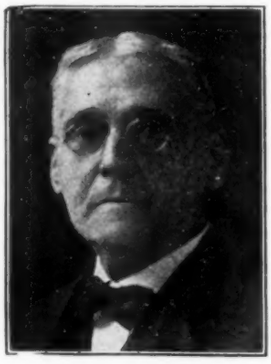
Robert Hamilton, a manufacturer of brass goods, with a factory at Nos. 85-87 Adams street, New York, died August 15, at his home, No. 24 Hicks street, Brooklyn, N. Y., at the age of seventy-one years. He was one of the pioneer manufacturers in the east and was well known. He was a member of Brooklyn Lodge, No. 288, F. and A. M., and is survived by a wife and three sons.

George Vreeland Tompkins, formerly president of the New York Metal Exchange, and a member of the metal firm of C. E. Schmidt & Company, died July 29, at his summer home at Basking Ridge, N. J. He was sixty-six years old. Mr. Tompkins was interested in charitable and educational work in Brooklyn, N. Y., where he lived for many years.

ERSKINE ANDRUS

Fifty Years a Brass Caster.

Erskine Andrus, of Bridgeport, Conn., whose death on August 6 was noted in the August issue of THE METAL INDUSTRY, was probably the oldest brass caster in the United States. Mr. Andrus at the time of his death was eighty-four years old, and had been casting brass for the Bridgeport Brass Company, Bridgeport, Conn., for over fifty years. He was one of the original stockholders of the Bridgeport Brass Company, and was with the company when it went to Bridgeport in 1865, having been an employee of the parent concern in Brooklyn, N. Y., then known as the Brooklyn Brass and Copper Company.



ERSKINE ANDRUS.

Mr. Andrus had already been casting brass for ten years before he became connected with the Bridgeport Brass Company, and as he had retired from casting at the age of seventy-nine it appears that he had been a brass caster from the age of nineteen, and when he did retire it was not from infirmity or physical disability, but because he thought he had earned a rest.

Mr. Andrus' yearly production for about fifteen or twenty years was a million and a half pounds of metal. This metal was principally brass, and as is well known contains a considerable percentage of spelter, but in all this long period of casting Mr. Andrus was never ill as a result of his work and he

never considered this industry as a menace to good health, advising other men to stick to the work as being perfectly safe.

One important point stands out regarding Mr. Andrus' career, and that is that he was abstemious in habits, so Mr. Andrus' life is a forcible example of what THE METAL INDUSTRY has repeatedly brought forward editorially, and that is that alcoholic beverages and endurance in the casting of brass do not go together.

JACOB LANGELOTH

Mr. Jacob Langeloth, a well-known and highly respected metal merchant and financier, died at his home in Riverside, Conn., on the 14th ult. from heart failure.

He was born in Mannheim, Germany, in 1852, was educated in German schools and universities, and served for a time in the German army. In 1887, he came to the United States, and soon after organized The American Metal Company, Limited, of which he soon became president. He later became connected with the firm of E. Balbach & Son (now Balbach Smelting & Refining Company), which was the first company to introduce into the United States the electrolytic process for refining copper, and through his foreign connections he was able to give that concern the benefit of many new and valuable discoveries in smelting processes which had been made in Germany.

Personally, Mr. Langeloth was noted for his interest in the employees of the various companies with which he was associated, and at the time of his death he was engaged in preparing plans for a new city to be built at Burgettstown, Pa.—renamed Langeloth. This is the site of the new plant of the American Zinc & Chemical Company, which is just nearing completion, and he provided in his will for the creation of a fund to be used by his trustees in carrying out extensive plans for parks, playgrounds, libraries, etc., for the use of the company's employees.

At the time of his death, Mr. Langeloth was either an officer or a member of the directorate of the following companies: The American Metal Company, Limited; Corn Exchange Bank; Balbach Smelting & Refining Company; Miami Copper Company; Metallurgical Company of America; Mexican Bank of Commerce & Industry; Compania de Minerales y Metales; Bartlesville Zinc Company; American Zinc & Chemical Company; Wetherill Separating Company; Compania Minera de Penoles.

In 1903, Mr. Langeloth married Miss Valeria Knapp, who alone survives him.

Trade News

BUSINESS REPORTS OF THE METAL INDUSTRY CORRESPONDENTS AND TRADE ITEMS OF INTEREST FROM THE DIFFERENT INDUSTRIAL CENTERS OF THE WORLD.

WATERBURY, CONN.

SEPTEMBER 8, 1914.

Fall is approaching with some favorable indications as to future business conditions so far as they affect Naugatuck valley industries. It is hard at this time to decide whether the favorable features in prospect are due to better conditions generally or to a feature of war's effect on European industries. Up to date the impression seems to have prevailed that the war's effect could not be very beneficial, as it would be destructive of tangible wealth and labor to such a degree that all the world must suffer from it eventually. Some orders have come to Naugatuck valley concerns which would have gone abroad otherwise, but how long these will last and whether or not prompt payments can be expected remains to be seen.

Concerns in Shelton, Derby, Ansonia and Seymour which manufacture cloth-covered eyelets, corset steels and stays seem to have been among the first to benefit from the stopping of German manufacturing in those lines. They have benefited to the extent that they have found it necessary to call in all hands who had been laid off and to begin night operations. One concern has received orders for goods used in the manufacture of corsets from an old customer who had not been on the books for six years, having turned its trade to German factories because of the difference in price. It has now placed orders enough with one shop down the valley to insure its operation on full time and with full force all winter.

Waterbury has seen a sign of war's benefits to American industries in the sudden increase in activity of the American Metal Hose Company. This company is an outgrowth of German industry, in a sense, as it was on orders from Germany that this product was made here, at one time. When the company started it purchased some of its machinery from Germany and now, because of the war, Germany finds its former customer its competitor. Some slight increases in orders have been noted in the business of the American Brass Company, the Scovill Manufacturing Company and the Chase Rolling Mills Company. Orders have grown large enough to put the Waterbury Clock Company back to five days in some departments and the Waterbury Manufacturing Company has continued on five days. The Plume and Atwood Manufacturing Company has continued on five days, but with a minimum of help, a condition that is painfully apparent in most of the large factories hereabouts, and one which, it is hoped will not long continue.

One of the best branches of the Plume and Atwood Manufacturing Company which has continued most encouragingly is the mantle lamp making branch. Oil mantle lamps have taken a strong hold on the western cities and towns and have been sold steadily with consequent activity here. Now, however, war in Germany threatens to shut off the supply of the chemicals used in treating the mantles, and of course Waterbury's mantle frames will not be wanted if the mantles cannot be made for them.

So it goes. War helps and hinders here and not yet is there any evidence of really valuable increases in business hereabouts on account of it. Time will tell, and a prolonged war is sure to be a boon to many brass industries, but it is sure, also, far-sighted manufacturers believe, to be followed by industrial depression because of the necessarily heavy war taxes, direct and indirect on all consumers here as well as abroad.—F. B. F.

BRIDGEPORT, CONN.

SEPTEMBER 8, 1914.

The European war has affected this city the same as all other large manufacturing centers, some concerns reporting a falling off in business, and others an increase in orders, but on the whole trade seems to be very quiet with the prospect, however, of its picking up in the fall. Just before the war started there appeared to be a decided feeling of optimism due to the large crop in sight, but all predictions were upset by the foreign calamity, although it must be admitted that the local institutions have weathered the storm quite well so far. Naturally the outlook is uncertain, and a great many of the manufacturers are playing safe, but with the coming of fall and the laying in of stocks for the winter a good deal of business ought to result. Bankers report that they are not affected by the war, and no steps have been taken toward getting any emergency circulation.

The freight rate decision long expected denied an increase to the Eastern roads, and hence there was no sign of a boom among the concerns which would benefit from railroad orders. The commission's findings, however, were almost completely overshadowed by the war. According to officials of one of the

largest cartridge manufacturers their business will not be increased owing to the fact that arms and ammunition are contraband and cannot be shipped to any of the warring nations. It was conceded though that they were very busy, as in the past, and it is also reported that one of the large gun builders has received extensive orders. The brass, iron and aluminum foundries are on the whole very quiet, especially in automobile work, and do not see much improvement ahead. The advance in the price of aluminum has made it hard for those foundries not prepared for it.

One of the largest automobile companies has curtailed its output somewhat and reduced their forces to a five-day schedule. They state that this will be only temporary, as they will shortly be supplying their cars to the trade which previously purchased foreign cars, and they expect this to augment their sales considerably. Cyclecar business continues to be good. A concern located nearby is turning out its first models. On interviewing one of the brass rolling mill's officials it was learned that they were quite busy, and were receiving orders which were formerly placed abroad. Their manufacturing end of the business, making brass hub caps, pumps, stampings, etc., is similarly affected. Metal pattern makers are fairly busy with a good outlook for fall, but the past month has been pretty quiet. Brass metal goods makers are also as busy as could be expected.

With one of the large builders of machines, tools, etc., it is a different proposition, and they are almost shut down except in one department where they are turning out a few new boring mills as a consignment. Manufacturers of bicycle and motorcycle lamps report this season as their quiet period anyway, and expect a revival in the fall. One of the concerns turning out brass, iron and copper wire and screens in this vicinity has been very slack for the past few months, but hope for a renewal of trade this fall.

Sidney K. Becker, formerly connected with the aluminum Castings Company, in Fairfield and Detroit, has resigned his position to join forces with the sales department of the Locomobile Company.

The F. C. Sanford Company, makers of welding machines, etc., who were burned out a short time ago, are erecting a new building on Fairfield avenue.

The Board of Fire Commissioners has closed a deal with the Electric Cable Company whereby they can purchase 11,000 feet of cable at $400 per 1,000 feet, a saving of $83 a 1,000 feet over that previously paid, and it is claimed to be a higher grade of material.

The offices of the National Electro-Process Company have been closed by its promoter, J. M. Murphy, who has left the city, and the projects which he was starting are said to be "dead." This is the company about which a report was made in a previous number of THE METAL INDUSTRY in regard to the water clarification projects, etc., which were demonstrated before the Board of Trade. Obligations of $1,600 are said to have been left behind and little of the stock worth half a million dollars, although it is claimed that the stockholders will be taken care of in the new concern which is another filter venture in New York.—F. H. C.

NEW BRITAIN, CONN.

SEPTEMBER 8, 1914.

So alarming is the labor situation in this city resulting from the European war that the city has authorized an additional appropriation of $22,000 for new street improvements so that the many unemployed men may secure work to provide funds to support their families. Business conditions amongst the metal manufacturing concerns is dropping off considerably, and most of the factories are going on to short time. The Stanley Works and the Russell & Erwin division of the American Hardware Corporation are now working on a forty-five hour schedule, and the Corbin Cabinet Lock division as well as the P. & F. Corbin division and other branches of this concern are running but five days per week.

To date the North & Judd Manufacturing Company seems to be hit the hardest. This concern has a large foreign trade, and the working schedule has suddenly dropped to forty hours per week, the factory starting up at 8 o'clock in the morning and closing at 5 o'clock. The officials at Landers, Frary & Clark's have also found it necessary to shorten their weekly working time for the present to four days per week and nine hours per day. Many of the supplies used in factory departments come from points abroad, and shipping is not dependable. Therefore it is necessary to conserve the available supplies and return to the full running time when commerce reopens. J. F. Lamb and A. G. Kimball, officers of the concern, state that they look upon the situation with utmost optimism. "It will probably be only a short time that this conservation schedule will be necessary. We are sure that this shortening of hours is only to last a brief period," were their words at the time the short time order was issued. A couple of weeks of this experience, however, served to change their attitude, and Mr. Lamb made the statement that instead of becoming improved "business is dropping off and it's a crime."

Of all the larger metal using concerns in this city the Vulcan Iron Works, the Hart & Cooley Company and the Fafnir Bearing Company are about the only ones who have not been hard hit as yet. Three-quarters of all the export trade from this city is said to be shipped from the Stanley Rule & Level Company, and consequently it appears that this factory will be hard hit by the European troubles. As yet, however, the officials have not decided to shut down and the shops are still working on a fifty hour schedule.

Mayor Quigley has established an employment bureau in his city hall office in order that he may obtain some accurate figures as to the number of men out of work because of the dull times. So far he has received a large number of applications, most of which come from unskilled factory hands who have been laid off because of the dropping off in the trade conditions. He finds that the metal industry business is poor at the present time, and it is the cheaper class of help that is suffering from being laid off, the more skilled labor being retained but put to the inconvenience of going on to short hours.—H. R. J.

PROVIDENCE, R. I.

SEPTEMBER 8, 1914.

There is a generally chaotic condition of affairs among the local metal concerns at the present time that is causing much concern. It is stated on good authority that there are more men out of work or on half time than at any time since 1893. The jewelry manufactories, of which there are over 200 aside from the allied and auxiliary trades, are not furnishing employment for more than one-quarter of their usual force; the extensive plant of the Brown & Sharpe Manufacturing Company, after extending its annual vacation period an additional week, started up the latter part of August with a greatly curtailed force and several other large plants are running on shortened time schedule or shortened force. The jewelers, however, try to see some hope through the war situation in Europe, claiming that the cessation of production in Germany, Austria and France will stop the flood of cheap lines coming to this country and at the same time will stop similar shipments to South America and Central America and thus afford the factories in this country an opportunity of furnishing the latter countries. Already several firms are working along this line for new trade.

The war in Europe is having its effect on the Washburn Wire Company at Phillipsdale by shutting off supplies that are needed in the manufacture of their products and causing a considerable advance in the price of material that can be obtained in this country. Unless the avenues of commerce are opened up within a reasonably short time, permitting the corporation to secure its supplies, it may result in the shutting down of the plant for an indefinite period. The plant of the American Screw Company is working but three days a week and the office is only open from 8 till 1 o'clock each day.

Samuel H. Brower, of this city, has been appointed agent for the New England States, New York, New Jersey and Pennsylvania for the Rome Tubing Company, of Rome, N. Y., manufacturers of a line of brass, copper, aluminum and steel tubings.

Following is a list of all corporations, concerns and individuals connected with the metal industries of this city that are assessed for $50,000 or more, together with the valuation placed upon their property by the Board of Tax Assessors, according to their report just filed at the office of the city treasurer: American Screw Company, $1,747,260; Almy Water Tube Boiler Company, $50,240; American Emery Wheel

Works, $65,740; Herbert J. Astle, $51,260; Brown & Sharpe Manufacturing Company, $4,074,440; Colvin Foundry Company, $95,100; W. H. Coe Manufacturing Company, $50,000; Fuller Iron Works, $131,840; General Fire Extinguisher Company, $539,800; Gorham Manufacturing Company, $1,772,560; the Metal Products Corporation, $123,160; New England Butt Company, $191,420; Samuel M. Nicholson, $199,600; Nicholson File Company, $706,880; Phillips Lead and Supply Company, $57,600; Rhode Island Tool Company, $369,160; Ellen D. Sharpe, $780,680; Henry D. Sharpe, $553,250; Lucian Sharpe, $319,880; Loderick H. Tillinghast, $76,100; United Wire & Supply Company, $137,020; United States Mill Supply Company, $57,340; D. M. Watkins Company, $50,000.

The M. F. Williams Company has been incorporated under the laws of Rhode Island for the purpose of manufacturing jewelry in this city with a capital stock of $50,000. The incorporators are Manuel F. Williams, Grace A. Craven and Thomas F. Sexton. The Auto Brass Manufacturing Company, 56 Friendship street, is being conducted by Adrien J. Thereault, according to information that has been filed with the city clerk's office.—W. H. M.

BOSTON, MASS.

SEPTEMBER 8, 1914.

Conditions in the metal industry here vary widely. Business at the moment is quiet in the precious metals, as a rule, platinum feeling the effect of the war in enhanced value of stocks on hand, because the metal is essentially an import product, while the manufacturers of jewelry from platinum, as well as from gold and silver, recognize the check that has been given to their production, both from high cost of material and increased economy on the part of the purchasing public.

This same element of precautionary economy affects other lines of production. It is supplemented as a factor in the situation by decreased exports in the case of copper and brass, decreased imports in the case of tin, scarcity of aluminum and disturbance and hesitancy as to the outlook for other lines of raw material.

Makers of chandeliers and interior fittings of various kinds find demand, although perhaps less than normal, nevertheless fair, because of the general progress in the direction of modernizing dwellings and offices at all growing centers of population in this section.

Silver and nickel platers, makers of brass beds and manufacturers in kindred lines have little to complain of, but find the general call for their products to date this year pretty well up to the average. In no line, however, is there a disposition to engage in speculative enterprise. Most of the goods on the market were placed there as the result of orders duly given for actually foreseen requirements.

A leading jewelry manufacturer in the Jewelers' Building here stated today that his shop had not enough orders to keep the workmen all busy, and those who desire to prolong their vacations are willingly allowed to do so—at their own expense.

During the past month the British steamship Indrasamha arrived here from the Orient and in the cargo was 200 tons of antimony, according to the local daily press, which was said to have increased in value, between the time of arrival and unloading, from 6 cents to 18 cents a pound.—J. S. B.

ATTLEBORO, MASS.

SEPTEMBER 8, 1914.

The effect of the European war on the jewelry industries has been closely studied in the Attleboros, where the result is of particular moment, but thus far it has been determined as both a hindrance and a help. Yet the situation appears encouraging rather than alarming.

The imported supply of imported stones, so largely used in the trade, is cut off and prices are advancing to a prohibitive mark. But it is being suggested that this is not an unmixed evil because prices on the unfinished goods of this class have been unusually low. While the cutting of the stone supply works a change it may be a change for the better appreciation of the grade with a consequent readjustment of prices so that there will be more profit in the business, even after the stone supply is renewed. The Attleboros therefore see conflicting but hopeful results from the war, though no one is eager to win industrial profit at the expense of some other nation's misfortune.

The B. S. Freeman Company, of Attleboro Falls and Barden and Hull, of Attleboro, have consolidated into the Freeman, Barden and Hull Company, manufacturers of fine jewelry, with a factory at Attleboro Falls and New York office in Maiden Lane. The new company has taken over the business of the firm of Barden and Hull, of Attleboro, which has moved to Attleboro Falls and has purchased the assets, consisting of machinery, tools, etc., of the B. S. Freeman Company. The firm will manufacture the lines heretofore carried by the B. S. Freeman Company. Barden and Hull were organized in 1883 and the B. S. Freeman Company in 1847. The firm has organized with B. S. Freeman, president; W. F. Barden, treasurer and secretary, and H. E. Hull, vice-president. These men will also act as directors of the concern.—C. C. C.

NEWARK, N. J.

SEPTEMBER 8, 1914.

The public library of this city is making a special feature of getting the largest collection of catalogs in the country, of all lines of trade. All manufacturers or jobbers are requested to send a catalog for filing purposes. This is to further the trade and industrial work.

The Waterhouse Manufacturing Company, of 229 Mulberry street, changed their name to the Waterhouse & Freeman Manufacturing Company. They make automobile brass trimmings, and operate a plating plant.

E. G. Meeker, who formerly made jewelers' steel and brass wire brushes at 46 Green street, and who failed about a year ago, has started in business again under the name of McIntosh Company, 55 Maple avenue, Irvington, N. J.

The Webb Manufacturing Company expect to increase their tempering plant. They make special mono coil shafts for speedometers and are making small polishing outfits for the jewelry and silverware manufacturers.

The Central Plating Company, located at the foot of Center street, has discontinued business.

Ad. Unbehand, formerly of Boston, has taken over the James N. Morehouse Company, platers, the Newark Brass & Plating Company, and has started the American Art Metal Company. They will all be located at 46 Laurence street. Fred Krone is at the head of the etching department, and Albert Rogers, formerly of the Board of Trade, is the secretary of the Morehouse Company and the Newark Brass Plate Company.

Mr. Unbehand controls entirely the American Art Metal Company, who will manufacture white metal and plated goods, advertising novelties, etc.

Eckelhoefer Brothers, of Irvington, N. J., have installed new machinery and rearranged their plant. They are going into the manufacture of sheet metal work in brass and steel. They will also enlarge the plating room and go into gold plating more extensively than ever.

William P. Field, of 763 Broad street, has drawn plans for the new factory for the Oneida Community at Sherrill, N. Y., for the manufacture of silver plated ware. The entire third floor will be used for plating and finishing.

The State of New Jersey will have a big exhibit of jewelry, silverware, metal goods, etc., at the Panama-Pacific Exposition at San Francisco, next year. It is understood a special effort will be made through these exhibits to enlarge the export trade to Central and South America.

Newark will hold another industrial exhibition September 12 to 26. It will be held at the First Regiment Armory, and the jewelry, silverware, etc., will be given special attention.—H. S.

PHILADELPHIA, PA.

SEPTEMBER 8, 1914.

The Keystone Silver Company, of 733 Sansom street, are getting out a new line of sterling silver hollow ware and novel-

ties. Willard E. Heisley and Matthias Southeimer now have charge of the factory.

The Pond Applied Art Shop, manufacturers of hand made jewelry, silver and brass goods, of Baltimore, Md., have moved their shop to New York City.

The McHalton Foundry has succeeded the McHalton Smelting Company at Fifteenth street and Washington avenue. Worrall W. Wagner is president; J. C. Wright, secretary, and B. H. Davis, treasurer.

The Allentown (Pa.) Brass and Manufacturing Company have erected a brass casting and hardware plant at Rittersville, Pa.

The Aluminum Company of America, of Pittsburgh, have installed ten cranes in their plants at New Kensington, Pa., Massena, N. Y., and at Knoxville, Tenn.

G. H. Clamer, with the Ajax Metal Company, has taken out a patent for replacing part of the nickel in nickel steel with low nickel contents, by varying amounts of copper. The latter raising the elasticity and tensile strength of such nickel steel, without lowering the ductility. The patent covers alloy as high as 6 per cent. in nickel and 2 per cent. in copper.

The Standard Roller Bearing Company, owing to the large demand for steel, brass and bronze balls, have opened an office at 1201 State Life building, Indianapolis, Ind., in charge of L. M. Watkin, Jr.

The Victoria Metal Company, of Erie, Pa., have built a new brass foundry and installed a die casting department.—H. S.

LOUISVILLE, KY.

SEPTEMBER 7, 1914.

Business is about holding its own in the metal working trades of Louisville, and while no large business is developing, enough small work is being secured to keep most of the plants fairly busy. Copper is about holding its own, although there is very little demand just now. Tubes and rods of both brass and copper are in fair demand, while solder and block tin are going strong. The European situation appears to have scared the users of both block tin and solder into a buying humor. It is rather hard to supply the demand just now, however, as local stocks are low, and the same condition appears to exist all over the country. The climbing of block tin is worrying a number of the copper men who use this material in large quantities in tinning the interior of stills, milk coils and canning equipments.

One of the most peculiar orders placed in this market for some time was an order recently received by Frank & Merz, manufacturing jewelers of Louisville, for 6,000 small 14 karat gold coil springs. These springs were made of No. 34 drawn wire, and were 3/16 of an inch in length and the inside diameter was the size of an ordinary pin. The person who ordered the springs was reticent regarding the use he intended to make of them, and as he paid cash in advance for the work his name was not mentioned in the transaction. The gold was tempered to a rather stiff degree for the work.

L. C. Stege, of the E. A. Stege Manufacturing Company, reports that business is good, and that August showed up as one of the best months on the company's records. Both foundry and plating work has been excellent and two extra polishers had to be hired to handle the finishing work. The work has been nearly all job work and few very large contracts came in. Mr. Stege has just returned from a month's vacation spent at Bay View, Mich.

The Standard Milk Machinery Company was recently incorporated for $3,000 by local men to manufacture and assemble milk machinery for pasteurizing milk. The officers of the new concern are C. Mortensen, president; John K. Ritchey, vice-president; and Tom Hines, secretary-treasurer. The castings will be made at the copper shop of Hines & Ritchey, and the finishing work will be handled by the American Brass & Plating Company. Assembling accommodations have been secured at Twelfth and Main streets. All three concerns are controlled and officered by practically the same men.

A fire which recently started in the plant of the Hillen Brass Manufacturing Company, at 308-10 West Green street, caused a loss of about $1,500, fully covered by insurance. George P. Hillen, president of the company, stated that belting and some machinery were destroyed, but that most of the damage was to the building. The plant was closed for a few days after the fire, but is again running. Business has been very good all summer, but is slowing down a little just now.

The Warman & Wolf Company, of Madisonville, Ky., are contemplating establishing a plant at Covington, Ky., to manufacture aluminum products.

Owners of Ford automobiles in Louisville have been giving the plating works a quantity of work to do within the past few months in changing the general appearance of their cars to some extent, so they will be slightly different in looks from the numerous other Ford cars. A number of owners have had their radiators nickel plated, while others have had their hub caps, rods, lamps and metal work on wind shields worked over, so that they can identify them easily.

J. W. Rademaker, of the Independent Brass Foundry, reports that business is rather quiet just now, though he is expecting it to pick up shortly. No government work has been had during the past month, and several of the other regular customers have not been in need of castings. A large order for aluminum work was received, however, from B. F. Avery & Sons, local plow manufacturers. These orders were for aluminum patterns, or spiders, and weighed 50 to 60 pounds each, which is a big casting for aluminum, as it weighs light.—G. D. C., Jr.

BUFFALO, N. Y.

SEPTEMBER 7, 1914.

The present European war is beginning to work both a hardship and benefit upon local concerns. As most of the chemicals used in the United States come from Germany and England, local concerns are suffering for the want of certain chemicals. Prices have gone up with no telling where they will eventually land if the war continues. The supply of chemicals must be limited, as they seem very hard to get. And the only solution for American chemical users is to turn to our chemists and ask them to get their dusty books down from their shelves and discover a process all their own. A combination of elements obtained from American soil which will do the same work. As it will take a long time after the war does stop before the chemical operators abroad will be in full swing and able to supply the needs of their old markets.

Then take the metal line, prices have come down on tin and antimony and yet it is almost impossible to get any. As all the tin comes from Germany, England, Australia and the East Indian Islands, who are at war with each other, importations have been at a standstill. However, there happens to be a small quantity of tin in the United States, but it is not mined, therefore it is of little use at present to offset the present demand.

Another very important metal badly in need by the brass foundries is antimony, which comes from Japan, Austria-Hungary, France, Algeria, Italy, Mexico and Turkey, and again we are confronted with the war situation. Fortunately there happens to be a large supply of this metal in California and Nevada, which at present is producing about 3,000,000 pounds a year, but not sufficient to supply all the needs of the foundries. One possible reason the supply dealers are eventually holding up their orders and what little supply they have is possibly for material advantages. This of course remains to be seen.

In the copper trade things are very favorable, and especially in the finished and rolled lines. Local concerns, as well as others, will profit. In the past American copper shippers were in the habit of quoting lower rates for copper in Canada because they used Canada as a means of disposing of their surplus output. But since the war English and German copper shippers have been at a standstill, and Canada beginning to shut down its mills, America has been called upon to supply the needs of the Canadians, which of course will mean a boom in the copper business, and a boost in prices for American goods in Canada.

It will take a long time for Europe to fully recover from the effects of this war. The expert mechanics who are now fighting for their respective countries will have been slaughtered, with the result that after the war the European shops will be filled with mere amateurs or apprentice boys and other unskilled labor with few expert mechanics. This will result in an inferior quality and decrease in output.

American foundries and electroplaters will have to be supplied with material all this time, which ought to result in the making of American products made of American made materials.

Americans ought to utilize and use, and develop her own metal resources, and build up an American merchant marine to market her products. If all of this were possible, then the war has and will have been of untold damage to Europe and a great benefit to America. And it is evident that we must turn to our geologists, metallurgists and chemists to save us from this metal and chemical famine.—G. W. G.

TORONTO, ONT.

SEPTEMBER 8, 1914.

Dean Brothers, of 188 Richmond street, West, are working up a good trade in jobbing all kinds of brass, bronze, aluminum and copper goods and brass founding.

The American Electro Plating Company, owned by John Collins, has been sold to W. McDermott, who has enlarged the silver work department.

The Moffatt Store Company have enlarged and remodeled their plating department.

David Dixon bought the brass foundry of Malcolm Company at 64 Lombard street and will specialize in plumbers' goods.

COLUMBUS, OHIO

SEPTEMBER 8, 1914.

The European war is having a bad effect on the metal trade in Columbus and central Ohio. Naturally trade has fallen off from the quietude of several months back, and the war combined with the general business depression is playing havoc. There is scarcely any market at all for copper, brass and some other metals. Prices have declined from the levels which maintained a month ago, and the outlook for the future is anything but bright. Dealers in metals are playing the waiting game and are not buying any stocks of consequence, even at the low quotations. On the whole the general war is having a bad effect all along the line.

Copper trade is slow and prices are almost anything that the purchaser seeks to offer, within reasonable limits. The volume of trade is small. The same state of affairs characterizes the brass market. Some demand is reported for aluminum, but prices are weak. Babbitt is also rather quiet. Other metals share in the general depression.

The Warren Stamping Company, of Warren, Ohio, has been incorporated with a capital of $50,000 to do general metal stamping by J. G. Gates, Charles Myers, P. R. Vautrot, H. G. Roll and R. C. Baxter. At Cleveland, Ohio, it is reported that Emil Hirbel will construct a brass foundry at 6601 Morgan avenue to cost $8,000. Franc H. Quinn, a brass moulder with a shop at 46 East Jenkins avenue, Columbus, has filed a petition in bankruptcy in the federal courts.

At Coshocton, Ohio, the Beach Enameling Company proposes to erect a large addition to its present plant in order to increase the output. The addition will be 70 x 120 feet. In addition a machine shop 50 x 50 feet will be erected.—J. W. L.

CINCINNATI, O.

SEPTEMBER 7, 1914.

The principal factor under discussion in Cincinnati, as in most of the other cities of the country and the world, at present, is the effect of the European war upon business generally, and, as far as the metal trade is concerned, upon the metal market in particular. The general feeling is optimistic in this respect, although so far it is not by any means warranted by actual developments. In Cincinnati, the first and only effect felt so far is distinctly bad in some quarters, as it came in the shape of cancellations of orders intended for foreign shipment, thus immediately cutting off just that much business and adding to that extent to the dullness which has prevailed in the machinery and other lines here for some time. As these lines are large consumers of brass, copper and other metals, the metal industry has been correspondingly affected. In a word, business is still slow, as it has been for several months, although local founders and specialty manufacturers have been able to keep as many men employed as heretofore.

It is confidently expected, however, that business will ultimately be considerably bettered by the war, as experts and observers all agree that should hostilities last very much longer the many markets supplied by Germany and England will be open to the United States; and the Cincinnati Chamber of Commerce has been conspicuous among the commercial bodies taking active steps to see that the full advantages of this are gained for their respective localities. Connections have already been effected with business men in most of the larger South American cities by the Cincinnati organization, and plans are under way by means of which it is expected that Cincinnati manufacturers will be able to gain much valuable business in that part of the world.

One of the officers of the Lunkenheimer Company, which is one of the largest manufacturers in the country of brass goods used in connection with machinery, said recently: "If the war lasts for any considerable length of time we look for our business, as well as that of other American manufacturers, to be greatly benefited. In the meantime, our domestic business is improving steadily, inquiries being more active than for some time, while last month was very satisfactory. Of course, exports have been shut off completely, and these form an important part of our business. Also, imports of tin, which we have to use very largely, have been cut off for the time being. These are the immediate effects of the war, but the ultimate outcome should be such as to make them relatively unimportant."—K. C. C.

DETROIT, MICH.

SEPTEMBER 8, 1914.

Brass and aluminum manufacturers here declare the European war has not continued long enough to have any effect on business conditions in Detroit or Michigan. They do, however, agree that this line of industry will be affected more or less if the war should extend over a great period of time. This statement applies only to those concerns whose business is confined to American trade. Concerns which have been doing an export business with South America say that practically everything is at a standstill, owing to lack of transportation facilities, and also to disturbances of banking facilities throughout European cities. They say that shipments are being held up until exporters learn how they are going to obtain payments for goods consigned. These facts were brought out at a recent meeting of the export committee of the Detroit Board of Commerce. As soon as the National City Bank of New York City has in operation its new South American branches, Detroit firms will be able to transact business through them.

Traffic Commissioner Waterfall, of Detroit, states he learns it will be about two months before banking conditions are established in South America, and the first of the year before shipments can be made from Detroit to South American ports. When these difficulties are cleared away many manufacturers of brass and aluminum supplies are planning to enter the export trade. The prospects of new markets are causing considerable anticipation among manufacturers of a decided change for the better in business conditions.

G. C. Hall, secretary of the Detroit Brass Works, states that the European war has had no effect on his company, and says business conditions as he finds them, are much improved. He believes this apparent change for the better is due to the fact that building material, such as plumbing supplies, are becoming exhausted and the need of this product is causing a revival of trade. He also says the European war has not continued long enough to affect the brass and aluminum business in this country to any extent.

One hundred and fifty members of the Lake Superior Mining Institute, which has been in session at Ishpeming, Mich., came to Detroit this week to visit the plant of the Detroit Copper and Brass Rolling Mills and the plant of the Solvay Process Company. These delegates represented copper mining interests in every part of the country. They came to Detroit on one of the lake passenger steamers, and during the trip down from the Upper Peninsula elected the following officers: President, one year term, L. M. Hardenberg, Hurley, Wis.; vice-presidents, two year terms, G. R. Jackson, Gwinn, Mich.; T. A. Flannigan, Hibbing, Minn.; managers, two year term, Henry Rowe, Ironwood, Mich.; Enoch Henderson, Houghton, Mich.; M. E. Richards, Iron River, Mich.; treasurer, E. W. Hopkins, Commonwealth, Wis.; secretary, A. J. Yungbluth, Ishpeming, Mich. While in Detroit the visitors were the guests of the Detroit Board of Commerce.—F. J. H.

NEWS OF THE METAL INDUSTRY GATHERED FROM SCATTERED SOURCES

The Pilling Brass Company, Waterbury, Conn., plans the erection of a one-story 52 x 11 feet addition to its factory on Watertown avenue.

Taunton-New Bedford Copper Company, Taunton, Mass., contemplate the erection of a new brick addition to their factory 49 x 36 feet. The building will be used as a refining plant.

Landers, Frary & Clark, New Britain, Conn., manufacturers of hardware specialties, report that the plans for the erection of three factory additions to cost $30,000 have been abandoned on account of present business conditions.

The Employees' Aid Society of the H. Mueller Manufacturing Company, Ltd., Sarnia, Ont., Canada, held their second annual picnic at Tashamoo Park on August 15, 1914, and which was reported to be a great success by those participating.

The published notice that the Wakefield Brass Company, Vermilion, Ohio, will receive bids for the construction of a one-story factory is not correct at the present time, as they report that it has become necessary for them to postpone the erection of such a factory.

The Dunn Manufacturing Company, Mankato, Minn., have rented the building on South Front street, which is known as the Presley building. The company manufactures a new style door catch and their plant will include oxidizing apparatus for gold, silver, copper and other metals.

The Ocala Iron Works, Ocala, Fla., manufacturers of gray iron, brass and bronze castings, whose machine and pattern shops were recently destroyed by fire, are building a new fireproof concrete and brick building at a cost of $20,000 and which they expect to have in operation within thirty days.

The New Era Lustre Company, 92 William street, New York, have brought out Nelco Solvent which they claim is a real substitute for amyl acetate. They state that lacquer made with Nelco Solvent gives even better results than with amyl acetate, and that they will make quotations guaranteed against any advance in price.

To handle their increasing business in the northwest territory, the C & C Electric & Manufacturing Company, of Garwood, N. J., manufacturers of electric motors, generators and electric arc welding equipments, announce the opening of a branch sales office in the Security building, Minneapolis, Minn. This branch will be in charge of Mr. R. L. Wells.

The Aluminum Specialty Company, Manitowoc, Wis., which has been occupying all three floors of the Glober Building, York and North Sixth streets, have let the contract for a new building 60 x 200 feet on a site just purchased at Seventeenth and Wollmer streets. The company operates a stamping and spinning department and aluminum foundry.

The Farrel Foundry & Machine Company, Ansonia, Conn., report that while they have some export orders which have been held up on account of the European war, they are running on short time anywhere from three to four or five days per week on account of the general stagnation of business, but not entirely owing to their inability to fill foreign orders.

The General Aluminum and Brass Manufacturing Company, Detroit, Mich., are building a three story addition to its factory. The new addition will be used as a machine shop for the manufacture of bronze back babbitt lined bearings and for general brass finishing. The National Construction Company of Detroit, Mich., are the general contractors.

E. J. Woodison Company, Detroit, Mich., dealers in foundry and platers' supplies, announce that Pierce G. Smith, formerly with the Smith Foundry Facing and Supply Company, has been appointed manager of their Buffalo, N. Y., branch, located at 1200 Niagara street. The office will carry a stock of foundry and platers' and polishers' supplies. The Cleveland, Ohio, office of the Woodison Company is at 58 Alhambra building, R. H. Mills in charge.

The West Bend Aluminum Company, West Bend, Wis., manufacturers of aluminum kitchenware, are moving into its new factory. The shop is 50 x 250 feet, one and two stories, with a power plant 40 x 50 feet. The aluminum company is now employing more than fifty hands and has an investment of $100,000. The company also states that they are experts in aluminum welding.

The Imperial Brass Manufacturing Company, Chicago, Ill., will erect a plant at Redcliffe, Alberta, Canada. They will manufacture brass, hardware specialties, pumps, valves, faucets, self-heating flatirons, etc. The plant at Redcliffe will, as far as facilities are concerned, be practically the same as the Chicago plant, and they expect to have it in operation before the end of the year.

The $200,000 of the stock of the American Silver Company, which was held by the Bristol Brass Company, Waterbury, Conn., has been divided among the stockholders of the brass company, according to a vote passed on May 22 in proportion of one share of silver stock to each holder of four shares of brass stock. The shares are worth $25 each and form practically a stock dividend.

The Copp Stove Company, Ltd., Fort William, Ontario, Canada, announce the retirement of their plant manager, Fred W. King. W. E. Raymond has been elected successor to Mr. King and assumed charge on August 1. Mr. Raymond has had large experience in the stove manufacturing business both in the Dominion of Canada and the United States, and is thoroughly acquainted with all the details of the business.

The Goldschmidt Thermit Company, 90 West street, New York, announce that they have especially prepared a 10 per cent. cobalt copper alloy for use as a hardener in Britannia metal. This hardener is now being used and it is reported that such use enables manufacturers of Britannia metal to considerably reduce the gauge by the addition of a small amount and this naturally entails a considerable saving.

The Hendey Machine Company, Torrington, Conn., manufacturers of lathes, milling machines and shapers, announce the following changes in their selling agencies. For New England territory the trade will hereafter be handled direct from the factory, the company's line having previously been handled by Manning, Maxwell & Moore in this section. For New York City territory the establishment of an office in the Singer building and in charge of H. P. Eilers has been made. In western Pennsylvania they will be represented by the Laughlin-Barney Machinery Company, of Pittsburgh, Pa.

The Supplee-Biddle Hardware Company, Philadelphia, Pa., announces that they are now in a position to furnish cold rolled Monel metal in sheets and rods. Not being satisfied with the service that was rendered by ordinary rolling mills, the company has secured a modern rolling mill of their own and have been operating it full time for the past six months. A large stock of cold rolled sheets and rods has thus been accumulated and the company is now prepared to furnish this material on short notice. All cold rolled Monel metal rods are now guaranteed not to vary from .002 of an inch from size specified. Prices and full particulars will be given on application.

The Research Manufacturing Company, Oak Lane, Philadelphia, Pa., which is a subsidiary of the Ellwood Ivins' Tube Works, are now making Edis Compound, a substitute for sulphuric acid, for removing scale or oxide from brass, copper, German silver, iron, steel, etc. The manufacturers claim that Edis Compound does all the work of sulphuric acid, better and cheaper than the latter, and that on account of being put up in dry cakes or lumps which can be handled without danger the unhealthy effects of sulphuric acid are avoided. This material has been used for years in the mills

of the Ellwood Ivins' Tube Works and proved so satisfactory that it was finally decided to put it on the market. The company will be glad to give full particulars and answer any questions regarding this new compound.

INCREASE IN CAPITAL STOCK

The General Bronze Foundry Company, manufacturers of aluminum brass and bronze castings, Cleveland, Ohio, announce that, owing to increasing business, it was necessary for them to increase their capital stock from $10,000 to $25,000. F. J. Mikat is president; S. W. Hughes, vice-president; F. G. Brandt, secretary and treasurer; Joseph Mikat, superintendent, and W. E. Weaver, manager. All of the officers of the company were at one time connected with the Aluminum Castings Company of Cleveland, Ohio, and are familiar with foundry practice.

REMOVALS

Sauer Manufacturing Company, manufacturers of brass fixtures, Bridgeport, Conn., have moved its plant to the same building occupied by the Wood Manufacturing Company, Bridgeport, Conn.

The Michigan Brass Foundry Company, Detroit, has completed negotiations for the removal of its business to Battle Creek, Mich., where a new factory has been acquired. The company is capitalized at $30,000.

The Enterprise Brass Foundry, manufacturers of brass, bronze, aluminum, white metal, etc., Seattle, Wash., has moved its plants from 92 Virginia street to a new concrete building at Seventh avenue and Lander street, Seattle, Wash.

The C & C Electric & Manufacturing Company, of Garwood, N. J., manufacturers of electric motors, generators and electric arc welding equipment, announce the removal of their Detroit offices from 144 Seyburn avenue to 1111 Chamber of Commerce building. This office is in charge of Mr. R. K. Slaymaker.

The American Manganese Bronze Company, manufacturers of manganese bronze and high compression phosphor bronze, New York, announce that they have discontinued their office at 99 John street, New York. All correspondence should be addressed to their main office and works at Holmesburg, Philadelphia, Pa.

The Dalton Adding Machine Company announces the removal of its office and factory from Poplar Bluff, Mo., to East Norwood, Cincinnati, Ohio, where they will have greatly improved facilities resulting from larger floor space and increased factory equipment, together with the advantages of a more central location in one of the great manufacturing cities, and the company also announces that they are better prepared than ever to give prompt and efficient service.

INCORPORATIONS

Business organizations incorporated recently. In addressing them it is advisable to include also the names of the incorporators and their residence. Particulars of additional incorporations may frequently be found in the "Trade News" columns.

To manufacture metal specialties—The Bean Company, Berea, Ohio. Capital, $1,000. Incorporators: Roscoe Bean, G. M. Stager, F. W. Stager, A. A. Carson and E. J. Kennedy.

To manufacture metal specialties—The Rubicon Tool and Manufacturing Company, Dayton, Ohio. Capital, $1,200. Incorporators: E. J. P. Hill, C. O. Shaffer, G. D. Barck H. B. Barck and M. E. Shaffer.

To manufacture stamped metal products.—The Fairgrieve Metal & Stamping Company, Ltd., Toronto, Ontario, Canada. Capital $75,000. Incorporators, Francis Watt, D. E. Dean, O. H. King and others.

FOREIGN TRADE OPPORTUNITIES

[In applying for addresses at Bureau of Foreign and Domestic Commerce, Washington, D. C., refer to file number.]

No. 13375. Oil, woods, copper, and brass.—A business man in the Near East informs an American consular officer that he is in the market for oleo oil, hardwoods, copper and brass in sheets and disks. This merchant furnishes references.

No. 13334.—Copper and brass in sheets.—An old-established commission house in an important trade center of the Near East informs an American consular officer that it is anxious to handle copper and brass in sheets. American houses interested should send prices c. i. f. certain seaport and state terms of payment. Exporters writing to this firm are requested to send copies of preliminary correspondence to the consular officer who submitted the report.

No. 13559. Machinery for polishing and finishing tin and zinc plates.—An American consul reports that a society in his district dealing in artisans' tools and implements wishes to be placed in communication with American manufacturers of machinery adapted for polishing and finishing tin and zinc plates. Offers should be sent to the society in French or German, if possible.

INQUIRIES AND OPPORTUNITIES

Under our directory of "Trade Wants" (published each month in the rear advertising pages), will be found a number of inquiries and opportunities which, if followed up, are a means of securing business. Our "Trade Want Directory" fills wants of all kinds, assists in the buying and selling of metals, machinery, foundry and platers' supplies, procures positions and secures capable assistants. See Want Ad. pages.

PRINTED MATTER

Plumbers' Brass Goods.—A compact little catalog of 120 pages well printed with high class half-tones has been issued by the Frost Manufacturing Company, Kenosha, Wis., manufacturers of plumbers' supplies. This catalog is known as "D" and may be had upon request.

Foundry Cranes.—Catalog 110 devoted to cranes of all types for every service has been issued by the Whiting Foundry Equipment Company, Harvey, Ill. This catalog supersedes No. 82 and gives full description of the latest features of Whiting crane construction. Views of actual installations representing the wide field of service covered are shown with the object of assisting purchasers to select proper types for their use.

Sand Blasts.—The De La Vergne Machine Company, Mott Sand Blast Department, New York, are distributing a very interesting pamphlet on "The Sand Blast from the User's Viewpoint," which is a paper read at a meeting of the Associated Foundry Foremen of New York and by H. D. Gates, sales manager. This pamphlet was reprinted from the July, 1914, issue of THE METAL INDUSTRY. Copies may be had upon request.

Solder.—A new solder for aluminum, which has been named Aluminite, is announced in a booklet by the Aluminum Solder and Refining Company, Syracuse, N. Y. Aluminite, it is claimed, does not turn black and is useful in repairing defective castings and is also said to be the only solder that can be used in the manufacture or repair of aluminum articles. A number of convincing references as to the use of Aluminite are included in the booklet.

Metal Products.—The American Metal Company, Pittsburgh, Pa., have issued a small booklet describing the new "Amco" products, which consist of frictionless bronze, mill brasses, red metal and babbitt metals. The booklet also contains the story of the mixtures of the various products cited above and also some

good reasons why these materials should be used. The American Metal Company have a machine shop so equipped that they are able to machine and finish all bearings and bushings before leaving the plant.

Rolling Mills.—The Standard Machinery Company, Auburn, R. I., have just issued the tenth edition of their rolling mill catalog. This is a book of sixty pages and contains full descriptions and illustrations of the large variety of rolling mills manufactured by the Standard Company, including presses of all kinds, drop hammers, rotary swaging machines, wire drawing machinery, ball and roller bearings and miscellaneous machinery. Five different issues of catalogs are published, which cover all of the lines and copies of these may be had upon request.

CATALOG EXHIBIT

An exhibition of every kind of catalog may be seen at The Metal Industry office, 99 John street, New York. The Metal Industry is prepared to do all of the work necessary for the making of catalogs, pamphlets, circulars and other printed matter. Estimates will be furnished for writing descriptions, making engravings, printing, binding, for the entire job from beginning to end or any part of it.

METAL MARKET REVIEW

New York, September 14, 1914.

COPPER.

Considering conditions abroad and the consequent unsettlement in America, the copper market has held remarkably steady.

In the early days of August it looked as though there would be no exports of copper and that all foreign trading would stop. The London metal exchange has been closed but shipments have been going forward to England in good shape and the exports for the month were a little over 43 million pounds. This is a good deal better than seemed possible when the war was first started. To meet the abnormal situation the producers have restricted the production of copper and today the situation is well in hand. With prices fairly steady and the absolute certainty that when financial conditions and the foreign exchange tangle is straightened out, the copper market will be in a very strong position and much higher prices will prevail.

Lake copper is quotable at 12½ to 12¾ cents; electrolytic, 12¼ to 12⅜ and casting brands at 12⅛ to 12¼.

The demand from consumers has been fairly good, but there is lots of room for improvement and this is looked for during the coming fall and winter.

TIN.

With the London metal exchange closed and a threatened embargo on tin by the British government, the tin market has been up in the air two or three times and down again just as often. The first few days in August tin sold up to 65 cents and it looked like easily going to $1 a pound. Later on, when shipments began coming along freely, prices broke and fluctuated violently, it was impossible to keep track of the prices—one day there were free sellers at 40 cents and some sold at 39 cents; next day 47 cents was paid for the same tin. Towards the end of the month the market become more normal and with cable communication established a fairly steady market has resulted. There is plenty of tin in London, but the exchange muddle makes trading difficult.

The price September 8 is around 34 cents for prompt shipment and tin is offered down to around 32 cents for November delivery. Tin, however, under present conditions is too much of a gamble to interest consumers and very little future tin is being bought.

LEAD.

The trust price has been held steady at 3.90 New York basis and the independents have been sellers at the same price. The St. Louis market has been a seller at from 3.70 to 3.75. Market has been very quiet and consumers are only buying for immediate needs.

SPELTER.

The spelter market has been very active and prices were rapidly advanced owing to a foreign demand. So far nearly 2,500 tons have been exported and it is expected several thousand tons will be needed abroad. Prices advanced from around 5 cents early in August to 6 cents today, and 5.85 in East St. Louis. Home consumers are not active buyers and trade is very dull.

ALUMINUM.

Market is very dull and the home makers are quoting from 19½ to 20½ for 98 and 99 per cent. ingots.

ANTIMONY.

The antimony market has been very active and prices were rapidly advanced owing to the stoppage of shipments from Europe. Cookson's is quoted at around 14 cents; Hallett's at 13 cents, and Hungarian grade at 11 cents.

SILVER.

The silver market has been very unsettled and for several days there were no market quotations. Prices lately have been cabled from London and the market today is just about normal. New York is quoted at around 53¾ cents, with London at 24d.

PLATINUM.

The foreign markets have been closed for some time. The market is now fairly steady and quotable at $48 to $50 for ordinary refined and $52 to $54 for 10 per cent. hard.

QUICKSILVER.

The price of quicksilver has been up to $90. Market is quieter now and the wholesale price is quoted at $70 to $75 per flask, according to quantity.

SHEET METALS.

Sheet copper and wire have been reduced in accord with the lower copper prices. Sheet is quoted at 17½ cents base and wire at 13¾ to 14 cents. High sheet brass has been reduced to 13⅛ and all brass products have been reduced accordingly.

OLD METALS.

The old metal market has been very weak and unsettled owing to the closing of the European markets and prices here have suffered. Market is very dull.—J. J. A.

AUGUST MOVEMENTS IN METALS

	Highest.	Lowest.	Average.
COPPER.			
Lake	13.00	12.50	12.75
Electrolytic	12.75	12.25	12.45
Casting	12.05	12.15	12.30
TIN	65.00	38.55	50.60
LEAD	3.90	3.90	3.90
SPELTER	6.20	5.00	5.65
ANTIMONY (Hallett's)	20.00	7.15	14.95
SILVER	56.00	53⅛	54.54

WATERBURY AVERAGE

The average price of Lake Copper per pound as determined monthly at Waterbury, Conn.

1912—Average for year, 16.70. 1913—Average for year, 15.83. 1914—January, 14.75; February, 15.125; March, 15.00; April, 14.875; May, 14.75; June, 14.375; July, 14.12½; August, 13.

COPPER PRODUCTION

The Copper Producers' Association have decided, on account of the unsettled state of the copper market, not to issue any statement of the stocks of copper for the month of August.

DAILY METAL PRICES

We have made arrangements with the New York Metal Exchange by which we can furnish our readers with the Official Daily Market Report of the Exchange and a year's subscription to THE METAL INDUSTRY for the sum of $10. The price of the Report alone is $10. Sample copies furnished for the asking. We can furnish daily telegraphic reports of metal prices. Address THE METAL INDUSTRY, 99 John street, New York.

Metal Prices, September 14, 1914

METAL PRICES.

	Price per lb. Cents.
COPPER—PIG AND INGOT AND OLD COPPER. Duty Free. Manufactured 5 per centum.	
Lake, carload lots, nominal	12.75
Electrolytic, carload lots	12.35
Castings, carload lots	12.25
TIN—Duty Free.	
Straits of Malacca, carload lots	34.00
LEAD—Duty Pig, Bars and Old, 25%; pipe and sheets, 20%. Pig lead, carload lots	3.90
SPELTER—Duty 15%. Sheets, 15%.	
Western, carload lots	6.10
ALUMINUM—Duty Crude, 2c. per lb. Plates, sheets, bars and rods, 3½c. per lb.	
Small lots, f. o. b. factory	25.50
100 lb. lots, f. o. b. factory	23.00
Ton lots, f. o. b. factory	20.50
ANTIMONY—Duty free.	
Cookson's cask lots, nominal	14.00
Hallett's cask lots	13.00
Hungarian grade	11.00
NICKEL—Duty Ingot, 10%. Sheet, strip and wire 20% ad. valorem.	
Shot, Plaquettes, Ingots. Blocks according to quantity .....38 to	.43
ELECTROLYTIC—3 cents per pound extra.	
MANGANESE METAL	.95
MAGNESIUM METAL.—Duty 25% ad valorem (100 lb. lots)	2.50
BISMUTH—Duty free	3.50
CADMIUM—Duty free	2.50
CHROMIUM METAL—Duty free	.75
COBALT—97% pure	2.00
QUICKSILVER—Duty 10%	$75.00
	Price per oz.
GOLD—Duty free	$20.67
PLATINUM—Duty free	50.00
SILVER—Government assay bars—Duty free	.53¼

INGOT METALS.

	Price per lb. Cents.
Silicon Copper, 10%.....according to quantity	25 to 28
Silicon Copper, 20%..... " "	28 to 32
Silicon Copper, 30% guaranteed " "	30 to 34
Phosphor Copper, guaranteed 10% "	24 to 28
Phosphor Copper, guaranteed 15% "	25 to 29
Manganese Copper, 25%..... " "	25 to 29
Phosphor Tin, guaranteed 5%. " "	57 to 60
Phosphor Tin, no guarantee.. " "	41 to 44
Brass Ingot, Yellow..... " "	9 to 10½
Brass Ingot, Red..... " "	12 to 13½
Bronze Ingot ..... " "	11⅝ to 12
Manganese Bronze Ingots.... " "	18 to 20
Phosphor Bronze ..... " "	18 to 20
Casting Aluminum Alloys.... " "	16 to 18

PHOSPHORUS—Duty free.
According to quantity..... 30 to 35

OLD METALS.

Dealers' Buying Prices. Cents per lb.		Dealers' Selling Prices. Cents per lb.
10.75 to 11.00	Heavy Cut Copper	12.00 to 12.50
10.50 to 10.75	Copper Wire	11.50 to 12.00
9.75 to 10.00	Light Copper	10.75 to 11.00
9.75 to 10.00	Heavy Mach. Comp.	11.50 to 12.00
7.25 to 7.50	Heavy Brass	8.50 to 8.75
5.50 to 5.75	Light Brass	6.50 to 7.00
7.50 to 7.75	No. 1 Yellow Brass Turnings	8.50 to 8.75
8.00 to 8.50	No. 1 Comp. Turnings	9.50 to 10.00
3.25 to ——	Heavy Lead	—— to 3.70
4.00 to ——	Zinc Scrap	4.50 to 4.75
5.50 to 6.50	Scrap Aluminum Turnings	6.00 to 7.00
11.50 to 12.00	Scrap Aluminum, cast alloyed	12.00 to 13.00
13.00 to 14.00	Scrap Aluminum, sheet (new)	13.00 to 14.00
23.00 to 24.00	No. 1 Pewter	25.00 to 26.00
20.00 to 23.00	Old Nickel	20.00 to 24.00

PRICES OF SHEET COPPER.

BASE PRICE, 17½ Cents per Lb. Net.

SIZE OF SHEETS. Width.	LENGTH.	64 oz. and over.	32 oz. to 64 oz.	24 oz. up to 32 oz.	16 oz. up to 24 oz.	15 oz.	14 oz.	13 oz.	12 oz.	11 oz.
		Extras in Cents per Pound for Sizes and Weights Other than Base.								
Not wider than 30 ins.	Not longer than 72 inches.	Base	Base	Base	Base	½	1	1½	2	2½
	Longer than 72 inches. Not longer than 96 inches.	"	"	"	"	½	1	2	3	4½
	Longer than 96 inches. Not longer than 120 inches.	"	"	½	1	2	3	5	7	—
	Longer than 120 ins.	"	"	1	1½					—
Wider than 30 ins. but not wider than 36 inches.	Not longer than 72 inches.	"	"	Base	Base	1	2	3	4	6
	Longer than 72 inches. Not longer than 96 inches.	"	"	"	"	1	2	4	6	8
	Longer than 96 inches. Not longer than 120 inches.	"	"	1	2	3	4			—
	Longer than 120 inches.	"	1	2	3					—
Wider than 36 ins. but not wider than 48 inches.	Not longer than 72 inches.	"	Base	1	2	3	4	6	8	9
	Longer than 72 inches. Not longer than 96 inches.	"	"	1	3	4	5	7	9	—
	Longer than 96 inches. Not longer than 120 inches.	"	"	2	4	6	9			—
	Longer than 120 inches.	"	1	3	6					—
Wider than 48 ins. but not wider than 60 inches.	Not longer than 72 inches.	"	Base	1	3	5	7	9	11	—
	Longer than 72 inches. Not longer than 96 inches.	"	"	2	4	7	10			—
	Longer than 96 inches. Not longer than 120 inches.	"	1	3	6					—
	Longer than 120 inches.	1	2	4	8					—
Wider than 60 ins. but not wider than 72 ins.	Not longer than 96 inches.	Base	1	3	8					—
	Longer than 96 inches. Not longer than 120 inches.	"	2	5	10					—
	Longer than 120 inches.	1	3	8						—
Wider than 72 ins. but not wider than 108 ins.	Not longer than 96 inches.	1	3	6						—
	Longer than 96 inches. Not longer than 120 inches.	2	4	7						—
	Longer than 120 inches.	3	5	9						—
Wider than 108 ins., but not wider than 120 ins.	Not longer than 120 inches.	4	6							—

The longest dimension in any sheet shall be considered at its length.

CIRCLES, 8 IN. DIAMETER AND LARGER, SEGMENTS AND PATTERN SHEETS, advance per pound over prices of Sheet Copper required to cut them from ..... 3c.

CIRCLES LESS THAN 8 IN. DIAMETER, advance per pound over prices of Sheet Copper required to cut them from ..... 5c.

COLD OR HARD ROLLED COPPER, 14 oz. per square foot and heavier, advance per pound over foregoing prices ..... 1c.

COLD OR HARD ROLLED COPPER, lighter than 14 oz. per square foot, advance per pound over foregoing prices ..... 2c.

COLD ROLLED ANNEALED COPPER, the same price as Cold Rolled Copper.

ALL POLISHED COPPER, 20 in. wide and under, advance per square foot over the price of Cold Rolled Copper ..... 1c.

ALL POLISHED COPPER, over 20 in. wide, advance per square foot over the price of Cold Rolled Copper ..... 2c.

For Polishing both sides, double the above price.

The Polishing extra for Circles and Segments to be charged on the full size of the sheet from which they are cut.

COLD ROLLER COPPER, prepared suitable for polishing, same prices and extras as Polished Copper.

ALL PLANISHED COPPER, advance per square foot over the prices for Polished Copper ..... 1c.

ZINC— Duty, sheet, 15%.

	Cents per lb.
Carload lots, standard sizes and gauges, at mill.....8.50 basis, less 8%	
Casks, jobbers' prices	9c.
Open casks, jobbers' prices	8½c.

Metal Prices, September 14, 1914

PRICES ON BRASS MATERIAL—MILL SHIPMENTS.

In effect September 1, 1914, and until further notice.

To customers who buy over 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.13⅛	$0.14⅝	$0.15½
Wire	.12⅞	.14⅝	.15½
Rod	.12⅞	.15⅝	.16½
Brazed tubing	.17½	—	.20¼
Open seam tubing	.17½	—	.20¼
Angles and channels, plain	.17½	—	.20¼

50% discount from all extras as shown in Brass Manufacturers' Price List.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass	½c.	per lb. net advance
" —Best spring, drawing and spinning brass	1½c.	" " " "
Wire—Extra spring and brazing wire	½c.	" " " "
" —Best spring and brazing wire	1c.	" " " "

To customers who buy 5,000 lbs. or less per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.14⅝	$0.15⅞	$0.16¾
Wire	.14⅛	.15⅞	.16¾
Rod	.14⅛	.16⅝	.17¾
Brazed tubing	.18¾	—	.21½
Open seam tubing	.18¾	—	.21½
Angles and channels, plain	.18¾	—	.21½

Net extra as shown in Brass Manufacturers' Price List.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass	½c.	per lb. net advance
" —Best spring, drawing and spinning brass	1½c.	" " " "
Wire —Extra spring and brazing wire	½c.	" " " "
" —Best spring and brazing wire	1c.	" " " "

BARE COPPER WIRE—CARLOAD LOTS.

13½c. per lb. base.

SOLDERING COPPERS.

300 lbs. and over in one order	19c.	per lb. base
100 lbs. to 300 lbs. in one order	19½c.	" " "
Less than 100 lbs. in one order	21c.	" " "

PRICES FOR SEAMLESS BRASS TUBING.

From 1¼ to 3½ O. D. Nos. 4 to 13 Stubs' Gauge, 16c. per lb.
Seamless Copper Tubing, 19½c. per lb.

For other sizes see Manufacturers' List.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

Iron pipe sizes with price per pound.

⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
24	23	18	17	16	16	16	16	16	16	16	17	18	20	22	23

PRICE LIST OF IRON LINED TUBING—NOT POLISHED.

	Per 100 feet Brass.	Bronze.
⅜ inch	$8	$9
½ inch	8	9
⅝ inch	10	11
¾ inch	12	13
⅞ inch	14	15
1 inch	18	20
1⅛ inch	22	24
1¼ inch	25	27
1½ inch	32	35
1¾ inch	45	48
2 inch	56	69

Discount 55-5%.

PRICE FOR TOBIN BRONZE AND MUNTZ METAL.

Tobin Bronze Rod	17½c.	net base
Muntz or Yellow Metal Sheathing (14" x 48")	13½c.	" "
" " " " Rectangular sheets other than Sheathing	16c.	" "
" " " " Rod	13½c.	" "

Above are for 100 lbs. or more in one order.

PLATERS' METALS.

Platers' bar in the rough, 22c. net.

German silver platers' bars dependent on the percentage of nickel, quantity and general character of the order.

Platers' metal, so called, is very thin metal not made by the larger mills and for which prices are quoted on application to the manufacturers.

PRICES FOR SHEET BLOCK TIN AND BRITANNIA METAL.

Sheet Block Tin—18" wide or less. No. 26 B. & S. Gauge or thicker. 100 lbs. or more 5c. over Pig Tin. 50 to 100 lbs. 6c. over, 25 to 50 lbs. 8c. over, less than 25 lbs. 10c. over.

No. 1 Britannia—18" wide or less. No. 26 B. & S. Gauge or thicker, 100 lbs. or more 4c. over Pig Tin. 50 to 100 lbs. 5c. over, 25 to 50 lbs. 7c. over, less 25 lbs. 9c. over.

Above prices f. o. b. mill.

Prices on wider or thinner metal on request.

PRICE SHEET FOR SHEET ALUMINUM—B. & S. Gauge.

Gauge.	Width. Inches.	1 ton.	500 lbs.	50 lbs.	Less than 50 lbs.
20 and heavier	3-30	30c.	34c.	36c.	38c.
	3-30	32c.	35c.	37c.	39c.
21 to 24 inclusive	30-48	33c.	37c.	39c.	41c.
	48-60	39c.	40c.	42c.	44c.
25 to 26	3-30	33c.	36c.	38c.	40c.
	30-48	35c.	38c.	40c.	42c.
27	3-30	36c.	37c.	39c.	41c.
	30-48	39c.	40c.	42c.	44c.
28	3-30	37c.	38c.	40c.	42c.
	30-48	40c.	41c.	43c.	45c.
29	3-30	38c.	39c.	41c.	43c.
	30-48	42c.	43c.	45c.	47c.
30	3-30	39c.	40c.	42c.	44c.

The above prices refer to lengths between 2 and 8 feet. Prices furnished by the manufacturers for wider and narrower sheet. No charge for boxing. F. O. B. Mill.

PRICE LIST SEAMLESS ALUMINUM TUBING.

STUBS' GAUGE THE STANDARD. SIZES CARRIED IN STOCK.
Outside Diameters. BASE PRICE, 24 Cents per Pound.

Stubs' Gauge.	Inches.	¼ in.	5-16 in.	⅜ in.	½ in.	⅝ in.	¾ in.	⅞ in.	1 in.	1¼ in.	1½ in.	1¾ in.	2 in.	2½ ins.	3 ins.	3½ ins.	4 ins.	4½ ins.
11.	.120.	..	..	..	..	..	..	..	26	23	..	..	13	19	9	8	15	22
12.	.109.	..	..	..	..	..	..	..	25	..	..	..	14	..	..	..	..	..
14.	.083.	..	..	..	..	..	..	..	..	..	..	..	16	..	..	..	..	..
16.	.065.	..	..	..	..	..	27	26	26	23	22	20	20	20	20	26	30	36
18.	.049.	..	..	..	..	32	29	28	27	24	25	25	25	..	..	..	..	..
20.	.035.	116	..	45	38	33	32	31	29	28	29	29	29	30	37	48	57	80
21.	.032.	..	..	..	39	..	..	..	..	..	..	..	..	..	..	..	..	..
22.	.028.	137	97	47	41	37	36	34	33	..	..	44	..	..	..	..	..	..
24.	.022.	187	132	107	87	78	72	61	59	65	..	..	..	..	..	..	..	..

Prices are for ten or more pounds at one time. For prices on sizes not carried in stock send for Manufacturers' List.

PRICE LIST FOR ALUMINUM ROD AND WIRE.

Diameter. B. & S. G'ge	000 to No. 10.	No. 11.	No. 12.	No. 13.	No. 14.	No. 15.	No. 16.	No. 17.	No. 18.	No. 19.	No. 20.	No. 21.	No. 22.
Price per lb.	33	33½	33½	34	34½	35	35½	36	37	38	39	44	47

BASE PRICE GRADE "B" GERMAN SILVER SHEET METAL.

Quality.	Net per lb.	Quality.	Net per lb.
5%	18¼c.	16%	22¾c.
8%	20c.	18%	23¼c.
10%	20½c.	20%	25½c.
12%	21½c.	25%	33¾c.
15%	22½c.	30%	39¾c.

GERMAN SILVER WIRE.

Quality.	Net per lb.	Quality.	Net per lb.
5%	19¼c.	15%	26½c.
8%	21c.	16%	27½c.
10%	22½c.	18%	29¼c.
12%	24½c.	30%	45¼c.

The above Base Prices are subject to additions for extras as per lists printed in Brass Manufacturers' Price List and from such extras 50% discount will be allowed. The above base prices and discounts are named only to wholesale buyers who purchase in good quantities. Prices on small lots are considerably higher.

PRICES OF SHEET SILVER.

Rolled sterling silver .925 fine is sold according to gauge quantity and market conditions. No fixed quotations can be given, as prices range from 1c. below to 4c. above the price of bullion.

Rolled silver anodes .999 fine are quoted at 2½c. to 3½c. above the price of bullion.